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Improved Quartz Stamper.

The days of pan washing and surface mining of the precious metals are ended. The richest deposits, both of gold and silver, are found on the unyielding quartz rock, frequently in such minute particles as to escape the eye, yet so thoroughly impregnating the rock as to yield enormous returns to well-directed labor. An efficient mill, therefore, for crushing and disintegrating the rock is the first requisite in working quartz lodes.

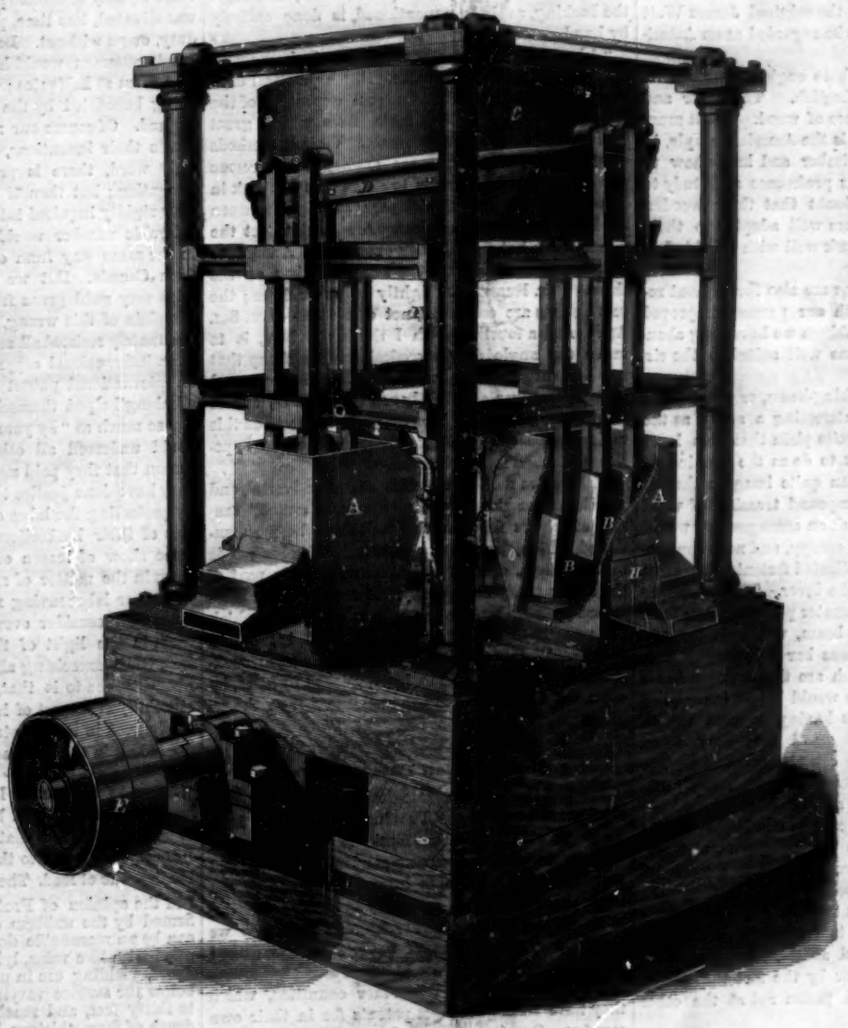
The improvement by the invention here illustrated consists in the mode of lifting the stampers by means of an inclined plane, for which the following advantages are claimed:—The mill works smoothly and opposes a uniform resistance to the motive power. The plane being long, and the lift gradual, the amount of friction is very small. The construction of the mill is compact and self-sustaining. It can be fed with more regularity, as all the batteries are within the immediate observation of the feeder, and its compactness renders the expense of housing comparatively small.

The prime advantage, however, which it possesses over all other stamping mills consists in its ability to lift the stamps to any required hight, and thereby concentrate any desired amount of power in the crushing operation, by means of the superior velocity acquired in the fall of the stamps.

The framing of the mill may be constructed either of iron or wood, and is cheaper and more durable than any other of the same power and material.

The engraving annexed represents a mill of four batteries, A, having four stampers, B, each weighing 400 pounds and having a crushing surface of 64 square inches with a vertical lift of 18 inches. With the cam wheel, C, making 100 revolutions per minute, the stampers deliver 1,600 blows in the same time. Fed with 3·75 gallons of water for each stamper per minute, the mill will pulverize and pass through a wire gauze of one-twentieth of an inch, about 1,500 bushels of quartz in twelve hours, requiring 46 nominal horse-power for the operation.

The action of the machine can be readily understood by the illustration. The wheel or drum, C, has on its outer surface a spiral ledge, D, like a screw, the ends of which slightly lap and are vertically about 18 inches apart. The inside of the drum carries another incline precisely similar. The whole is driven by the pulley and horizontal shaft, E, which, by bevel gears, rotates the upright shaft, F. The stampers, B, are gradually raised by means of friction rolls traversing the incline, half by the inside and half by the outside spiral, and as the upper end of the spiral reaches the rolls successively the stampers are dropped in rotation. G are pipes feeding the batteries with water, and H shows a wire gauze through which the liquid quartz is discharged in a continuous stream.



PATENT QUARTZ STAMPER.

For further information address John Ahern, President "Excelsior Stamper Mill Company," Box 610, Baltimore, Md., or Davison, Stiles & Woolsey, 200 Water street, corner Fulton, New York, at both of which places working models may be seen in operation.

An English Ship-builder on American Engines.

Mr. Norman Scott Russell entertains the following views with respect to our beam engines:—"The American steamboat engine has long been a subject of wonder to the English engineer. It is ugly, straggling, and inconvenient-looking; its incompactness, and want of snugness and economy of room, make it the reverse of everything we think good in a steamboat engine. It certainly made the same impression on me that it has done on all my countrymen, but it was at first sight, and at first sight only. Daily the unfavorable impression became mitigated by familiarity, and after a careful study of its details and qualities, I do not think it possible to design an engine more admirably fit for its use and purpose, under the circumstances where it is applied. In this country there is not a single engine which can be said to be entirely English and preeminently suited to any one purpose. The American walking-beam engine, on the other hand, is universal in the States, and acknowledged to be best suited to their Eastern river navigation. I think it will be admitted therefore, that the permanence of this kind of engine in the American steamers must be held as *prima facie* proof of its excellence, and that it is entitled to our respectful consideration, and likely to reward our careful study.

"I have examined its structure in the best workshops of America, and have watched its practical working in their best steamboats. I have satisfied myself that it is cheaper in construction, lighter in weight, more economical in management, less costly in repair, more durable, and better suited for high speed, than any of our own engines would be. I think that for the navigation of large rivers, like those of China and India, it might be adopted with great advantage, and many of its details, indeed, might be adopted with advantage in any engine.

"One great advantage which the walking-beam engine possesses is that of being the only one which imposes no restraint on the engineer in regard to length of stroke or diameter of wheel. I ought to except the fixed inclined engine; but it takes up so much valuable room in the hold of the ship that it is now entirely abandoned for river steamers, although still in use for ferry boats. The beam-engine, on the other hand, takes up but little additional room in the ship in proportion to the increase in length of stroke, but only raises the walking-beam higher above the vessel.

"It will be seen that the shallowness of the water determines one material point in the structure of the engine. It becomes impossible to get a long stroke directly under the shaft, the position in which English engineers have shown themselves so anxious to place it. Driven from below the shaft from want of hight, the Americans have placed their

cylinder immediately behind the crank, and with the center of the cylinder on a level with the shaft. This necessarily throws the walking-beam to more then four times the length of the crank above the level of the shaft, which, with a 12-foot-stroke, is equal to 24 feet. This also determines four times the length of the crank as the length of the connecting rod, and four times its length for that of the walking-beam. These parts are, therefore, in tolerable working proportions, and they necessarily determine the arrangement of the minor parts of the engine.

"The condenser, as in the older James Watt and Newcomen engines, is directly under the cylinder, forming a continuation of it, so that the cylinder stands immediately by means of this contrivance upon the kelsons of the ship, which are there made particularly strong.

"The arrangement of the air and feed pumps is like the old James Watt pumping engines, so that it seems as if the Englishmen on the other side of the water were more faithful descendants of James Watt than those on our side. The inventive and volatile Yankee—as we think him—has adhered doggedly to tradition and the original James Watt engine, which has come to be regarded as an American institution.

"One more feature of these engines is very remarkable and very un-English. The floor and framing of these engines are of wood. But it must be remembered that wood is the American staple, as iron is ours—they prefer timber and know how to use it. We have given our preference and study to iron. But there is no doubt that their wooden framing and engine floor are well adapted to their light wooden boats, and work well with this kind of engine.

"The details of the engine are also throughout remarkably at variance with our present improved practice; remarkably like things we have long abandoned, and at the same time well suited to the circumstance.

"The details of the walking-beam, or great working lever, are quite as interesting a study as the wooden framing. It is quite plain that this lever has exactly the same work to do as the framing on which it rests; and one can quite imagine that at one time it too was a compound trussing of wood and iron. The fault of such an arrangement would be, first, the room it would occupy, and next the considerable quantity of complicated fastening required at the working points of the lever. The Americans have, therefore, made the center portion of cast iron, and the four sides of the beam, which is lozenge-shaped, form one continuous bar of wrought iron, the two diagonals of which are the cast-iron frame before mentioned. There would be no other parts of this lever, but for its having to work the air pump; and, therefore, a small subsidiary truss, similar in principle, is contained within. The whole of this walking-beam is a fine piece of workmanship, and nicely fitted and finished.

"The connecting rod between the lever and the crank is an exception to the principle which regulates the rest of the structure. It is a wrought-iron bar thick enough to bear both the push and the draw, and, therefore, looks out of proportion to the rest of the structure. It is trussed against vibration by two stays afore and abaft it, and its weight is possibly compensated for by the fact that it has to balance the piston and piston rod at the other end.

"The valve and valve gear are, perhaps, the most refined and successful parts of the engine, and are certainly those in which it differs most widely from ours. They have reduced its details to an absolute working perfection. Nothing can be simpler, quicker, or quieter than their best specimens of valve gear.

"There are four valves, two for steam and two for exhaust; each consists of two circular disks placed some distance from one another, so that the pressure of steam on the upper may be counteracted by the pressure on the lower disk, while one is made a little larger than the other to keep the valves shut by the difference of pressure. Two pillar tubes, with cross entablature at top and a cross plinth at bottom, compose the old steam passages. Two shafts, worked by separate eccentrics, and four wipers on these shafts, give independent motion to each of the valves, so that the best points of steam and vacuum can be independently given. The great delicacy consists in giving to the wiper the precise curve that shall open and shut the valve exactly when wanted, and do it quietly.

"The great theoretical defect of the balanced valve is the loss of steam between the valves and in the passages, and when high steam is used and great expansion, the loss increases in a high proportion. In an engine of 400 nominal horse-power, the loss of steam is about 10 cubic feet of steam at every stroke. It may be urged that there is an equal loss of steam in the steam passages of the slide valve, but this loss can and has been reduced to a minimum by placing the valve immediately over the steam port, whereas the defect in the balanced valve is incurable.

On the other hand, there are advantages peculiar to the pupet valve, which, for the purpose it is intended, render it invaluable. The amount of power required to open and shut the valves is so small, that the largest engines, some of them 500 horse-power, are worked with perfect ease by one man, although the backing, as before mentioned, is done entirely by hand.

"I have before mentioned the principal theoretical defect of the balance valve. But a practical difficulty presents itself in the unequal expansion of the valves and their respective seats, from which great leakage and loss of steam result. Various methods—all of them ingenious—are applied to overcome this difficulty. One way is to grind the top disk in its seat while a piece of thick paper is placed between the lower valve and its seat. A second, to set the valves when hot and already expanded. A third, to cast the valve stem from the same melting as the chest. [Mr. Russell is slightly in error here; the valve stems are cast steel, not cast iron.—EDS. SCI. AM.] And a fourth, which I think the best, is to make the angle of the conical seat so sharp that any little expansion makes but little difference; and that both valves are tightly seated, without, at the same time, jamming. The requisite angle to do this varies from 15 to 20 degs., according to the experience of different engineers.

"The valve motion, which is almost universal, and is called, after the inventor, 'Stevens's cut-off,' consists of wipers fixed on the rock-shaft before mentioned, which, by lifting toes, attached by long rods to the valves, open and shut them for any part of the stroke easily and quietly. A rapid motion is attained by lengthening the wipers and toes, which are sometimes 30 inches, and even 36 inches, in length. The starting gear consists of a small rock-shaft, with small toes and wipers, worked by hand, by means of a long lever in the same manner as the eccentric.

The Canadian Patent Laws.

We find that in both branches of the Legislature the Patent Laws of the Province have again been receiving considerable ventilation. This is a sort of stock subject which comes up session by session, and numerous futile attempts have been made to get them altered, but most generally by parties desiring to favor the American inventors, or perhaps we should say, the owners of patents in the United States, who, in many cases, have got hold of processes and machines invented in other countries, which they have managed to get patents for in their own country. Our Government have all along resisted the attempts to change the law in a direction to afford greater facilities to our Republican neighbors to get exclusive rights of manufacture or sale for their notions and nostrums in Canada, believing that when the question of a renewal of the Reciprocity Treaty came again on the tapis, the concession would count for something; but they were evidently reckoning without their host, for Brother Jonathan never so much as adverted to the subject, or if he did, we must have overlooked the matter. No, no! he was too much impressed with the magnificent advantages he had to offer us, or perhaps we should say, to withhold from us, to advert to such a trifle as the introduction of his patents into the Provinces. But to return to our muttons, our rulers seem to have abandoned the idea of keeping the door close shut against foreign inventions, be they American, French, or Chinese. Not that they have proposed a new policy, or offered to bring in a measure to change the law, but they recommend, or rather suggest, to Parliament, that hereafter, each application for a patent right should be received and considered solely upon its merits; that is, that the advantage of the introduction of such a patent into the country should be examined with reference to the country itself, and not so much, if at all, with reference to the inventor or patentee. This seems reasonable enough; but the Honorable Mr. Ferrier, in the Legislative Council, further suggested, and, as it appears to us, very properly, that, in granting rights of this kind, it should always be made a condition that the article or thing to be produced or manufactured under such patent should be produced or manufactured in the Province. This was hitting the nail right on the head; for, in the past, rights have been granted by special legislation to aliens who, when once in possession of their parchment, went away and very coolly informed us that if we wanted the article they had acquired the exclusive privilege to make or to sell, we must go to Connecticut, Baltimore, or some other equally accessible place where the manufactory was situated, lose time, pay the packing, freight, and duty, or go without. But for these patents, our own handicraftsmen would have made the machines, and sold them at half price; and so our people, instead of being benefitted by the arrangement, were in fact injured. Of course our neighbors complain that we pirate their inventions, and, although it may be an ugly word, there is probably some truth in the allegation; but then, if the American patents were very rigidly inquired into, we apprehend a very considerable number would be found to have been got in the same way from other nations, and not a few from Canada. But we apprehend it hardly comes with very good grace from the American people to complain of this wrong, when they themselves have obstinately resisted all attempts at the establishment of an international copyright law, or, in other words, an international patent law for books. They have all along helped themselves to the best without saying so much as "by your leave," and, until recently, could undersell all other nations, for the simple reason that they paid nothing to the authors. When they have done justice to the literary men of Europe, by protecting the labor of their brains from the piracies of their booksellers, then they may talk with some show of reason of the wrong we have done them in the matter of mowing, thrashing, sewing, and other labor-saving machines. We trust Parliament will consider every application submitted to them in the light of the recommendations made, and, while exercising all proper neighborliness and liberality, see to it that, as much as possible, and especially in respect of inventions likely to be extensively used in the country, the manufacture shall be carried on in the Province.—*Quebec Gazette.*

LEAD IN SOUTHERN ILLINOIS.—Recent geological investigations, verified by actual experiments, seem to establish the fact that a large portion of Southern Illinois, contiguous to the Ohio river, contains valuable deposits of lead. The Louisville *Journal* says that "in the opinion of Professor Lyon, which is confirmed by the uniform experience of miners, there can be no reasonable doubt that the whole region is filled with like veins, lying from thirty to fifty yards apart, yielding ore in paying quantities at a depth below the surface varying in the main from twenty to thirty feet, and reaching down to the enormous depth of from thirteen hundred to sixteen hundred feet, growing richer the deeper they descend. Science and experiment unite in warranting the conclusion that the earth there is literally swelling with lead ore under conditions of development the most inviting to capitalists."

CEMENT FOR MILLSTONES.—Our readers doubtless remember that many persons were poisoned from eating flour ground on stones in which lead was used to fasten them. It would be valuable to many persons, especially those who use lead, if some experienced miller would send us a recipe for a cement for this purpose. All the hand-books on milling are silent on this subject.

AN American watch factory at Elgin, Ill., with $250,000 capital, will be ready to make sixty watches per day by September. Most of the stockholders were formerly workmen at Waltham.

OIL-MINING MACHINERY WANTED.

The whole series of machinery used in oil mining needs to be remodeled and improved, to say the least, while new and better kinds than those used, would be a boon indeed to the oil miner. During the war the best portion of the inventive genius of the country was engaged in devising means to kill off their fellow beings more rapidly. Now that meek-eyed Peace reigns triumphant over the land, the talents of inventors can be turned to better account in the peaceful arts. No better field was ever presented for the benefit of the practical inventor than the petroleum region of Pennsylvania. New methods, or new applications of old ones, are badly needed in every department of the oil-mining business.

Machinery of greater power and strength is needed for the drilling of oil wells; that which will dispense with the cumbrous samson post, and creaking walking beam, with its great waste of power; that which will also render the drilling of a well fifteen inches or even twenty in diameter as easy as it now is to drill one of four and a-half inches. Let it be so arranged that the driller cannot help from drilling a round hole to any depth, and one that can be measured with some degree of accuracy, after it is drilled. Machinery, combining these qualifications, will render the fastening of mining tools in the well almost an impossibility. At any rate, with sufficient room to fish for them they can be speedily recovered. This would save the oil region of Pennsylvania nearly a million of dollars, and perhaps three times that sum annually. Scores of wells are abandoned on this account, that gave promise of being as good producing ones as any in the oil region. Experiments should be tried with the wire instead of the rope cable, if cables cannot be altogether dispensed with. We don't believe that more than one out of every ten wells drilled, are true. This is, in a great measure, to be attributed to the use of rope cable. At the depth of fiv hundred feet it would seem hardly possible that the driller can tell whether his boring tools turn or not.

Machinery for the proper testing of wells, and the pumping thereof, is the greatest want of all. The liquid treasure is beneath the surface of our soil, Messrs. Inventors, and we want it. So does the world generally. Surely there is some effectual and comparatively easy way of getting it. Show us the way, and the greenbacks will flow into your coffers at a rate that will alarm you. Give us something that will supersede the use of the present coffee-mill apparatus, with its sucker-rods that always break just at the wrong time, and working barrel that always wants fixing. An article is wanted with suction enough to lift the oil from a depth of 1,000 feet. If one pump won't do it, why not use more? These are only a few of the articles needed. If a machine is effective, and meets the want for which it is intended, we want the inventor to commence the manufacture of the same forthwith. Oil miners have no time to peddle patent rights.

The inventors of every nation are invited to compete for the mastery in this contest. And we shall take great pleasure in publishing through the columns of the *Register*, all the results of their efforts that they will favor us with, or will furnish them with any information relating to the kinds of machinery now in use here.—*Oil City* (*Pa.*) *Register.*

In our observations in the oil regions of Western Pennsylvania, extending over a period of four or five weeks, we were struck with the want of common ingenuity displayed in the contrivances used for boring and pumping oil wells. The walking beam contrivance, mentioned in the *Register*, was simply an adaptation of the old-fashioned well-sweep, and lacked the first qualification of boring—that of forming a straight hole. The temper screw and simple device calculated for the turning of the drill, at each stroke, in passing through rock, seemed to us to be miserably inefficient. The twist of strands in the cable, perhaps two hundred or three hundred feet deep in the earth, would neutralize all the efforts of the driller, who was satisfied with giving a partial revolution to the end of the cable he managed. If the drill struck a stratum of rock inclined at an angle, or the sloping face of a boulder, the tendency, all the time, until the drill had bedded itself, was to slip off at an angle and consequently to make a crooked hole. This, we believe to be the cause of many of the annoyances of tools sticking in the well. In fact this want of mechanical genius is understood by oil men, who, to remedy the defective operation of the ordinary drill, have the follower, or reamer, made very thick so that the area of the bearing surface shall neutralize, to some extent, the neglect of regular rotative motion in the drill.

We scarcely agree with the *Register* that "machinery for the proper testing and pumping of wells is the greatest want of all." It seems to us that the machinery for this purpose has been improved much faster than the machinery for boring. In No. 1 of the present volume we noticed a device for elevating the oil in wells which promises to be effective. But an improved apparatus for boring wells is greatly needed. Many wells have been abandoned because the tools, or some portion of them, could not be extricated. Any deviation from a straight line in the bore of a well must be a great hindrance to its proper tubing. If the tubing can be placed to the bottom of such a well, there is a strain on the pipe which severely tries the joints, and makes the drawing of the tube for deeper drilling almost, if not quite, an impossibility.

There certainly appears to be an excellent opportunity for inventors to exercise their talents on the improvement of well-boring machinery.

Sodium Amalgamation.

Some time since, and before I had heard of the use of sodium as an assistant in amalgamating metals, I prepared the result of the following experiment for publication. Circumstances delayed it, but I now give it to the interested for what it is worth. Having given my views to several practical men in this city, they tell me that the theory explains many things which they have met in their experience that were incomprehensible to them, and they have urged me to make it public.

THE EXPERIMENT.—Take a clean tumbler and fill it about two-thirds full of clear water; then drop a little finely-pulverized metallic powder upon the water. Gold dust or bronze (such as printers use, and nearly every printer has it), or silver powder will answer, provided it be sufficiently fine. Then stir it smartly with the handle of a spoon or the blade of a knife. It will be seen that the powder will not sink in the water; but, on the contrary, the more it is stirred the more obstinately it keeps at the top. When you have sufficiently demonstrated to your own satisfaction the almost impossibility of sinking the metal, which, being heavier than the water, by the laws of gravity should sink, drop into the tumbler a little caustic potash or soda, and stir a little, the powder will then be seen to leave the top, and in a short time settle at the bottom of the water.

THE CAUSE OF THE METAL FLOATING.—Atmospheric air adheres with great tenacity to any highly polished surface, and is very difficult to displace. It preserves a knife blade by preventing the moisture from getting to it to oxidize it. Dip a knife blade or a razor into water, drawing it out you will find that it has not been wet—a film of air interposed between it and the water. So with each particle of dust which you placed on the water in the tumbler. Notwithstanding its being so exceedingly fine, it is surrounded with a layer of atmospheric air as thick as that on the surface of a knife blade. The particle being round and smooth, no mechanical means which you can use will displace the air so that the water can get to it, and the air being lighter than water acts as a balloon to sustain the piece of metal. If you agitate it in the water with a spoon, or force it down by any other means, the air will stick to its piece of metal, and as soon as you let it alone it will rise to the surface. How it is that the alkali makes the air let go its hold on the metal I do not know. The experiment shows that it does do so, and the metal sinks.

APPLICATION OF THIS TREATMENT TO AMALGAMATING THE IMPALPABLE GOLD DUST IN QUARTZ ROCK, AND ITS THEORY.—Suppose every particle of gold dust in quartz rock to be as fine as the dust with which the experiment is made (and much of it is finer), very little of it would have its film of air displaced by the mechanical operation of crushing, although, on account of much of it clinging to the particles of quartz, it would not float; part of it would sink to the bottom, part would remain floating between the bottom and the surface of the water, the film of air and the quartz dust fighting for the mastery, the air trying to take it to the top, and the quartz dust trying to pull it down. As long as the particle of gold or silver remains covered with the air, the mercury cannot come in contact with it any more than can the water. The mercury to take it up must come in contact with the naked gold, and not with the gold protected by a mantle of atmospheric air. Therefore, in order to the effectual amalgamating of gold or silver dust from quartz rock, some means must be used to disperse the air surrounding the particles of dust. Heat will do this partially, but caustic potash or soda will do it effectually. It also acts as a deoxidizing agent—that is, if the oxide of some base metal should be in contact with the gold, it will remove it, or clean the gold, and it will keep the mercury clean. About 1 lb. of caustic potash or soda will remove the air from metal that is immersed in 5 gallons of water. Does not this explain the cause of the advantage derived from the use of sodium? If this is the true theory, whence the necessity of using the expensive metal itself? It cannot be denied that the sodium is oxidized and becomes soda, and is dissolved in the water in the pan. When that takes place, and not until then, does this sodium produce the beneficial results. I am aware that alkalies have been used in amalgamating pans with partial success. But have they been used intelligently? Common potash, or soda of commerce, in the best state in which you can buy it, is composed of 40 or 50 per cent of carbonate. In transporting it to the mines, and from exposure to the air when opened, a much larger per centage is turned into carbonate, and in that state is of little use to disperse the atmospheric air. To be effectual for this purpose it must be as nearly caustic as possible. In regard to the electrical effect resulting from the use of alkalies in the amalgamating pans, my experience proves that it cannot be otherwise than highly beneficial. Zinc, lead, and antimony would be taken up in large quantities by a caustic alkaline solution when contained in an iron vessel. I have used, and for some purposes prefer to all others, especially for precipitating the reguline copper, a battery composed of iron and zinc in a solution of caustic potash.—*Wm. Hilmer in the San Francisco Mining and Scientific Press.*

Profits on Tea.

In the report of the Revenue Commission we find the following facts about the profits on tea:—

The original price of good tea is about 18c. per lb. This is the "ship off" price. The Chinese producer does not get this. There is the export duty, tolls levied at the various stations on the way to port, expenses of packing, and the two or three profits accruing before the tea reaches the hands of the exporting merchant. Adding his profit, the price at a Chinese port of shipment is, as stated, about 18c. per lb. for good tea. Staple grades of black Oolong tea are laid down in New York at about 30c. per lb., free of duty—that is to say, "in bond." This includes all charges, selling commission, freight, insurance, etc.; all over this price being profit.

The Commission state that the profits of the tea trade, after leaving the importer's hands, and before reaching the consumer, have been enormous. They add, that of the profit paid by the consumer not more than one-fourth reaches the original importer. Three-fourths of it stops in the pockets of the jobber and the retailer.

The Commission tested this by the following case: A pound of Oolong tea was purchased of each of two different and respectable grocers in New York, on the same day, at $1 50 per pound. This tea was immediately taken to one of the leading "tea-brokers" and valued by him at a market price of 90 cents for one of the samples, and 93c. for the other. The market for tea at the time was steady, and had been so for months, gold also being steady at 146 to 147. The broker's valuation, returned to the Commission on the samples submitted to him, was the price at which the tea would have been sold by the importer. The tea in question cost, say about 80 cents in currency, laid down in New York, duties and all charges paid. The importer's profits ranged from ten to thirteen cents per pound, while the balance of the cost to the consumer, amounting to fifty-eight cents, or seventy-two per cent upon the cost to the importer, is cribbed by the jobber and the retailer. The Commission say: "A condition of trade that admits such an iniquitous profit to be made out of the consumer, certainly needs reformation."

The consumption of tea in the United States is set down at 30,000,000 pounds annually.

EMERSON'S SWAGE FOR SPREADING AND SHARPENING SAW TEETH.

No tool in the mechanic arts is more useful than the saw, and any improvement in the saw, or in the manner of keeping it in order, will be of interest.

The new tool here illustrated is intended to spread the points of the teeth, bring them to a proper cutting edge, and make them all of uniform width at the same operation. Fig. 1 shows the body of the swage or upset; Fig. 2 the sliding swage pin; Fig. 3 the saw tooth; Fig. 4 the long jaw or guide of the swage; Fig. 5 shows a slot to allow the swage to be used on a fine-toothed saw.

The faces of the guide, 4, and the sliding pin, 2, are hardened. In the pin, 2, is a slot cut the exact shape and width of the point of the tooth as it

should be. The sliding pin, 2, is made to fit exactly in the swage, so that the point of the tooth coming in the joint will be left with a proper cutting edge without filing. By placing the point of the tooth, 3, in the die, as shown in the engraving, and striking on the end of the swage with a light hammer, repeating the blows till the point of the tooth is brought to a propor width and shape, a better cutting edge is obtained than can be made by filing.

This simple, cheap, and effective tool was patented through the Scientific American Patent Agency, June 6, 1866. For further information address the American Saw Company, sole manufacturers, No. 2 Jacob street, New York, or Trenton, N. J.

NOTES ON NEW DISCOVERIES AND NEW APPLICATIONS OF SCIENCE.

[From the London Mechanics' Magazine.]

NEW METHOD OF OXYDIZING LIQUIDS.

Mr. James Hargreaves, of Widnes, has recently devised an apparatus for the oxidation, by air alone, of bodies dissolved in water, which constitutes a novel and very ingenius application of the injector principle. It was devised for use in the soda manufacture, for the oxidation into sulphate of the sulphide of sodium contained in the complex solution obtained by the lixiviation of "black ash." This oxidation had previously been effected by means of nitrate of sodium, which is a very costly material, the necessity for the use of which, for the purpose in question, Mr. Hargreaves's contrivance entirely obviates. Mr. Hargreaves puts the crude liquor into a vessel furnished with a false bottom, which false bottom is perforated with numerous small holes, and has inserted in it, at its center, the lower end of a pipe which passes up to a little above the top of the vessel, and terminates at its upper end in a throat, immediately above which is fixed a jet connected with a boiler, the steam in which should be kept at a pressure of about 40 lbs. per square inch. Steam from this jet rushes into the funnel-shaped throat and then down the pipe, carrying with it into the space between the bottom of the vessel and the false bottom very large quantities of air, which then issue through the holes in the false bottom and rise through the solution, "causing," says Mr. Hargreaves, "an intense commotion," and coming into contact with so large a surface of the solution as very rapidly to oxidize all oxidable matters contained in it. The heat communicated to the solution by the steam greatly facilitates this process of oxidation. Mr. Hargreaves states that a large charge of crude soda solution may have all the sulphide in it completely oxidized by this method in from four to five hours.

THERMO-ELECTRIC PROPERTIES OF MALLEABLE AND CAST IRON.

It has been well known for some little time that a thermo-electric pile, constructed of malleable iron and bronze, deflects the needle of the galvanometer to the left, whereas a similar pile constructed of cast iron and bronze deflects the galvanometer needle to the right. This curious fact, showing that malleable iron and cast iron have opposite thermo-electric properties, has lately suggested to M. Arnould Thenard, the idea of constructing a thermo-electric battery having cast iron for one element and malleable iron for the other, and that gentleman has found that a very powerful battery may be constructed in this way. A comparison of the electro-motive force of a malleable and cast-iron battery with that of a malleable iron and bronze battery, and that of a cast-iron and bronze battery, all three batteries being of the same size, showed that the electro-motive force of the malleable and cast-iron battery was equal to that of the cast-iron and bronze battery and that of the malleable iron and bronze battery put together.

PRODUCTION OF COLD BY METALS.

Dr. Phipson has found that when 207 parts of lead, 118 of tin, 284 of bismuth, and 1,617 of mercury, are mixed together, the air being at the temperature of + 17 deg. Centigrade, the temperature of the mixture falls to —10 deg. Centigrade. The mercury in such a mixture being readily recoverable, for use over again, by distillation, Dr. Phipson is of opinion that the production of cold by this method is susceptible of numerous useful applications.

THE "MIANTONOMOH" AT QUEENSTOWN.

The arrival, after a very successful trip across the Atlantic, of one of our monitors, seems to have given a new idea to our English cousins. Only a short time ago they were endeavoring to disparage our monitors as sea boats, while reluctantly admitting their possible value as harbor defenses. The performances of the *Monadnock*, a twin ship to the *Miantonomoh*, in passing Cape Horn, did not receive full credit, on the supposition that, instead of doubling the "stormy cape," she might have "crept through the Straits of Magellan." But the *Engineering* now says (issue of June 22d):—

"Our own advices from America leave no room for doubt that the *Monadnock* weathered Cape Horn, instead of going through the Straits of Magellan, on her most successful voyage to the Pacific."

The subsequent performance of the *Monadnock* in her run to San Francisco is additional evidence of her merits as a sea-going vessel.

In regard to the *Miantonomoh* the *Engineering* says:—

We are not dependent, either, upon interested or exaggerated American testimony as to her performance, for Captain Bythesea, R. N., who has been in America for some time on Admiralty service, came across in her in company with Mr. Fox, the Assistant Secretary of the United States Navy, and if the gallant captain did not himself write the *Times* account of the ship and her voyage, we may be sure it was written upon the best authority. "Crossing the Bay of Fundy, she encountered weather which, without amounting to a gale, was considered very boisterous, but she rode through it easily. On the voyage to Queenstown, the indicator marked no greater rolling than 7°, while 2° is stated to be the average. Her paddle wheel consorts, on the other hand, rolled to a maximum of 18° and 24° respectively."

The monitors, therefore, are not only seaworthy but comfortable. They are such ships as a crew can live in without want of light, air, or shelter, in at least a summer voyage across the Atlantic or around Cape Horn. And yet in Mr. Fairbairn's work on iron shipbuilding, published only a few months ago, and to which we refer for very clear plates of the double-turreted monitor, *Chickasaw*, and the single-turret, light-draught, twin-screw monitor *Nauset*, we find this conclusion: "As regards armor-plated sea-going vessels, the Americans have not made much progress. During the war they were not requisite, as the Confederates had nothing to compete with them; and hence followed a description of monitors which can only be admired as floating batteries or well-shaped rafts, calculated for the destruction of forts and a similar description of craft in smooth water." This was no more than the general belief, a few months ago.

The *Mechanics' Magazine* after saying that she made the run from St. Johns, Newfoundland, in ten days and ten hours, remarks:—

On the whole, her speed was at least respectable while, if her peculiar build be taken into consideration, we may even call it surprising. Taking, then, the general circumstances of the case we cannot consider this first voyage of a monitor otherwise than satisfactory, and as exhibiting the triumph of engineering skill as applied to naval construction. At the same time this successful visit must be suggestive to our Admiralty of dangers we are little prepared to face. The Federals have much larger classes of monitors, and if the *Miantonomoh*, which only represents one of the smaller, has been able to cross the Atlantic, is it not obvious that a squadron of powerful monitors can at any moment visit our shores? This monitor is on her way to Cronstadt, where she will meet with a flotilla of ships constructed much on the same principle. It follows that a junction of an American and a Russian fleet might eventually be made in our waters, and consequently, since it is given to no one to foretell events, it is the duty of Government ever to be prepared for the worst.

WHY NOT?

The *London Spectator* says that a firm in Manchester bound themselves by a trust deed to divide their profits, over fifteen per cent. on the capital invested, among their workmen:—

"The first result was a sudden decrease in waste, the men not seeing why they should waste their own property any more than any other master's; and waste is, perhaps, next to bad debts, the greatest source of manufacturing loss. The next was an immense advance in the pace of the work done, the men putting their hearts into it as hired people will not do, and scolding each other for neglect, as if each man was overseer. The last was a great increase of orders, every man being as anxious to obtain work, and profitable work, or, as he himself expressed it, to 'carry some'ut to bonus,' as if he had been the sole master. The result was a first dividend at the rate of fifteen per cent per annum, and four or five per cent over for division among the men."

Why would not the plan work well generally? A man who places his money at interest, by investing in loans, is satisfied with the regular and uniform percentage of profit. Why could not the dividends on manufacturing stocks be limited to the stockholders, and the surplus be divided among the employés? Indeed, we cannot see that the stockholders could lose much by such an operation, and it is certain the workmen would be great gainers. In a measure, they would become joint owners in the stock, at least they would feel jointly interested with the stockholders, and manifest a degree of interest in the success of the concern impossible to be realized when their profits did not so much depend upon the contingency of application, care, and economy. Such an arrangement would greatly reduce the liabilities of failure.

The Great Trial of Agricultural Machines.

Many of our readers may not be aware that a special trial of the principal reapers and mowers, is to take place at Auburn, New York, on the 10th instant. In view of the important interests connected with the trial, both agricultural and manufacturing, we shall dispatch a special reporter to the trial who will give a faithful and impartial account in detail.

The amount of premiums offered is very large, and the celebrity obtained by the best machine will be very wide.

The Atlantic Cable.

Our foreign files come filled with the all-absorbing subject in English circles of the Atlantic Cable. Want of space compels us to delay the publication of some interesting facts until another issue. The *Great Eastern* was to have left on the 8th instant, so that we shall soon know whether this third attempt is successful.

Unparalleled Success.

A telegram to the Associated Press announces that Commissioner Theaker will issue, this week, 202 patents. Of this number ONE HUNDRED AND FOURTEEN are for the clients of the Scientific American Patent Agency. The business of this office has rapidly increased during the past year.

PROF. HODGKINSON has shown that strains, however feeble, if long applied, produced some permanent elongation or contraction in bars of iron.

Correspondence

The Preservation of Timber from the Teredo.

MESSRS. EDITORS:—I notice in your last "Notes and Queries" an inquiry in regard to protecting timber in salt water from the ravages of the "teredo" or borer. As any information on the matter was solicited, I wish to state to you what has been done in our vicinity.

The bridge just built over the Taunton river, at Somerset, Mass., for the Old Colony and Newport Railway Company, by Capt. Wm. Cobb, of this place, has nearly half a mile of pile-work, and as the water is infested with the teredo, it became an important matter how to protect the piles; various schemes were presented, but the following method was finally adopted, it having borne the test of experiment in other waters:—

In a building erected for the purpose, a tank was sunk in the ground capable of holding 200 or 300 barrels. A cylinder of best boiler iron was built, sixty-five feet long and five feet in diameter, air-tight. Connected with the cylinder is a small steam engine force pump and air pump. The tank is filled with dead oil or creosote of commerce, an iron carriage loaded with piles is run into the cylinder, and the head, packed with rubber, is screwed down tight. The air pump is put on and a vacuum is produced in the cylinder, then, a valve being turned in the feed pipe, between the tank and cylinder, the dead oil rushes in and nearly fills the cylinder. The force pump is now applied and oil is pumped into the cylinder until the gage shows a pressure of 115 to 120 lbs., then the whole is suffered to rest from twelve to twenty hours, when the oil is allowed to run back into the tank, the head unscrewed, the carriage run out, piles unloaded and all made ready for another charge. The oil is kept hot in the tank by steam from the boiler.

This method is said to have been successfully tried in Germany and England, but I do not know whether it has ever been tried in the United States. Possibly some of your readers may have heard of it often.

G. C. B.

Dighton, Mass.

[In Vol. XIII., page 407, we published an article on this subject, detailing the plans which had been adopted in different places for the above purpose. One of the processes therein described was precisely like the one our correspondent describes, except that chloride of zinc was used to impregnate the wood rather than creosote. The letter of our correspondent will prove valuable to many of our readers.—EDS.

Large and Small Pulleys.

MESSRS. EDITORS:—In your valuable paper of April 7th, I notice a communication on the above subject, which is liable to mislead, as can be easily demonstrated by any one who will take the pains to duplicate the experiments mentioned by your correspondent, who has, as is often the case, deceived himself, in some way or other, in his deductions. It is not quite clear, in his statement, that he made the trial with a two-foot pulley. I would advise him to make that trial; and if he kept the 50-pound weights on the ends of his belt, he would find that it would take the same addition of weight to the one side to make the belt slip, as it did in the case of the 1-foot pulley. After making that trial, he can double the width of his belt, and if the same weights are put on (no matter which pulley), the same weight on one side, as in the first case, will make it slip—provided, always, that the belts are in the same condition.

Some five years ago I made quite a series of experiments in order to demonstrate the laws which control the transmission of power by pulleys and belts; the results were carefully noted by me at the time, for future reference, and I will give them to you in as concise a manner as possible. I hope they will prove as useful to your readers as they have been to me, and that they will cause more definite experiments to be made by those who have better means at their disposal than I had.

My first experiments were to determine the strain that leather and rubber belting, as well as lacing, would break at. These materials were subjected to a dead weight (*i. e.* no levers of any description), on a platform, which was also taken into account. The fastenings of the materials were such, that no part of their width was subjected to a greater strain than another, and if the fracture occurred near the fastenings, the experiment was not counted or noted.

Five experiments with leather belts, three-sixteenths of an inch in thickness, by one inch in width, gave a mean result of 552 pounds as the breaking strain of each; before breaking, their width contracted to about three-fourths of an inch.

Five experiments with leather belts, three-sixteenths of an inch in thickness, by two inches in width, gave a mean result of 1077 pounds as the breaking strain of each. Before breaking, their width contracted to about one and five-eighths inches, fracture commencing perceptibly at the edges, first appearing by many slight breaks on the skin side, which gradually widened until it broke at one of them.

Three experiments with leather belts, three-sixteenths of an inch in thickness, by three inches in width, gave a mean result of 1532 pounds as the breaking strain of each, contraction to two and three-fourth inches, fracture beginning as in former cases.

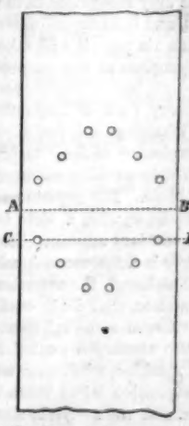
The rubber belting tried was cotton-filled and "three-ply" in thickness.

Five experiments with two-inch rubber belting gave a mean result of 1211 pounds as the breaking strain of each, did not contract in width perceptibly, and broke all at once, emitting a perceptible smell of rubber.

Five experiments with three-inch rubber belting, gave a mean result of 1763 pounds as the breaking strain of each—other items as before.

Experiments in great number were made with lacing, of various widths and thicknesses, but the results varied so much—no two being at all alike—and very much appeared to depend on the part of the skin from which the thong was cut. For instance, in some cases, a thong from near the back bone had four times the strength of that from other parts, so I could get no data that was worth noting.

The next experiments were made to determine the weakening effect of punching belts for the lacing, and the results proved that the belt was weakened to the extent of the sum of the diameters of the holes, if they were in a straight line across the belt.



The diagram here given will show the position of the holes in the belt which gave the very best results, as its cross section is only weakened by two holes at any place. A B was not cut, and C D was the invariable line of fracture, which first began at the edges, found assistance at the nearest holes to the edges, and continued across on the same line.

From these trials it can be seen that oval punches would be much superior to any other, as they would cut away less of the cross-section of the belt, and still give ample space for the lacing.

The next experiments were made with belts punched as in the above diagram, but cut through the line, A B, and then laced in a secure manner—results as follows:—

In leather belts, tearing began at the holes at five-eighths of the breaking strain, and continued on until the lacing tore out at the end holes, when the rest went suddenly.

In leather belts, after being subjected to one-half of the breaking strain for twenty-four hours, a slight addition to the weight caused them to tear at the holes, which, after commencing, proceeded rapidly, until the end holes tore out, when it went as before. After being subjected to one-half of the breaking strain for forty-five hours, it went as before stated. They stood one-third of the breaking strain for one week, and at the end of that time showed no signs of fracture.

In rubber belts, tearing began at one-third of the breaking strain. They stood one-fourth for twenty-four hours, but tore on a slight addition of weight. They stood one-eighth for one week without showing any signs of fracture. Eyeletting the holes brought the standing point up to the standing point of leather belting, the clinching of the eyelets on the cotton fiber or filling reducing the tendency to tear. I think that large oval eyelets would materially improve the fastening of such belts, particularly if the eyelets had large flanches so as to grasp or confine the material. They also operate well with leather belting, as their action is to distribute the strain all round the circumference of their holes, which is not the case without them, only a portion of the hole then receiving the strain. They likewise take from the belt the rubbing action of the lacing in rendering through the holes, which must have some effect on the portions in contact, as no belt can be laced so that the lacing will not render to some extent, saying nothing about the action of the same in the passage over pulleys, especially those of small diameter, where the action is continuous while in use transmitting power. My experiments with eyelets were not as satisfactory to me as I could have wished, as I was unable to carry them to any great extent, after so favorable results, on account of not being able to get them sufficiently large to take the lacing. I am confident that if I could have got them large enough, and of the right shape (oval), that I could have tested the belts up to very near their breaking strain, provided the lacing would have stood; and if it had not, I would have tried something else (catgut, etc.), until I found what would give first. As it was, the eyelets did not sufficiently bind the materials, although they gave much better results. I think that eyelets made expressly for the purpose would materially increase the duration of belting, as well as form a profitable article of manufacture.

I made no experiments with riveted belts, for two reasons:—1st. That it is a self-evident fact, that a riveted belt can be made much stronger at the junction than if the same were laced. Eyelets will act in a precisely similar manner, but only on one thickness of material, when used in conjunction with lacing; this was the reason I tried them. 2d. That all belts, being liable to stretch more or less from time to time, must have some portion of their length, which is easily accessible for the purpose of taking up the same, and as the usual and most ready means of doing this is by lacing, which is the weaker mode of fastening; then, the whole belt is liable to the contingencies of the same, and is therefore no stronger than that part, no matter how the other fastenings are made in its length. From these facts it can be be seen that, as a matter of self-instruction, which was my object, experiments made with riveted belts would be money, time, and considerable labor thrown away.

ROBT. G. CARLYLE.

Virginia, Nevada, May 10, 1866.

[To be Continued.]

Trouble With an Air Furnace.

MESSRS. EDITORS:—We manufacture malleable cast iron, and use an air furnace with smoke-stack about sixty feet high; but in warm, cloudy weather it does not draw good, or at least we cannot melt more than half the quantity we can in cold, clear weather. The opening or inside of the smoke-stack is square.

Would it draw better if the opening or inside was circular instead of square as it is now? Would it draw better, that is, melt quicker, if the stack was higher? if so, how high should it be? Lastly, if we were to build a furnace the same as we now use and attach a blast to it, would the iron be as good as that made with the regular air furnace (or natural draft?)

THOMAS DEVLIN.

Philadelphia, Pa.

A NEW museum has been projected in this city with a large capital, and John Banvard as president. The principal novelty in the exterior is that the brick is to be vitrified or glazed similar to the common brown pottery. This will give it a very brilliant appearance in clear weather and on moonlight nights.

Breech-Loading Rifles.

MESSRS. EDITORS:—I have read with no little interest, the letter of your Washington correspondent on the "trial of breech-loading rifles for the army," and also your remarks on "breech-loading rifles for sportsmen," in No. 24, Vol. XIV. of the SCIENTIFIC AMERICAN.

It is always pleasant to find one's own opinions endorsed and confirmed, as I do in two or three points in the above articles. First, it was a great satisfaction to me to learn that the Peabody rifle received the preference in the trial at Springfield, as I have always considered it the best and simplest gun for the use of the ammunition to which it is adapted, and which it has been decided to adopt for army use. I have urged its merits upon every one who has asked my opinion for two years past, and in repeated instances, when new inventions have been sent me for trial, my reply has been, after examination: "It is not equal to the Peabody." The letter of your Washington correspondent gave me the first intimation of its success with the Army Board, and without any interest in the gun itself, I am greatly pleased with such a decided confirmation of my opinion. The gun has never been in the market, and is comparatively little known, but if manufactured for sporting purposes, I am confident it would supersede all others yet produced for the use of the copper cartridge. But notwithstanding this opinion of its merits, and without any denial of the excellence of that kind of ammunition for military use, I still say that the Maynard is the only breech-loader that comes fully up to my ideas of what is requisite in a sporting rifle. There would be no difficulty in finding plenty of backers to the bet offered by Mr. Bradley, among those who are familiar with its powers. I have witnessed and taken part in a great many trials of rifles, of almost every description, and I have never seen any better shooting done with any muzzle-loader that was fit for field service, than with the Maynard. I do not compare it with the unwieldy target rifles with telescope sights, false muzzles, etc., for those can never be available for sportsmen; but I can show targets made with the Maynard, of ten successive shots, at fifty yards, all within a circle of an inch diameter; ten shots, at 100 yards, within a three-inch circle, and sixteen shots, at 220 yards (40 rods), within a nine-inch circle, and I have never yet seen a better performance with a muzzle-loading sporting rifle. I have a letter by me from an experienced Western rifleman who ordered a Maynard rifle on trial, and reports: "I can beat any muzzle-loader I ever saw, weighing less than thirty pounds." And I have testimony to the same effect from many different quarters. No other breech-loader, that I have tried, is so invariably accurate, and this accuracy is undoubtedly due, as your correspondent was assured by Dr. Maynard, to the exact centering of the bullet, which is attained by his mode of loading the cartridge.

The objection which I find most frequently made to the Maynard rifle is, that it is too light, "seems too much like a pistol," etc. No man was ever more strongly prejudiced in favor of heavy guns and muzzle-loaders than I used to be, but later experience has convinced me that the power of using a light or a heavy gun, with equal efficiency, is a matter of habit. For many years I hunted with a rifle made by Dickson, of Louisville, Ky., in 1835, with a barrel 33 inches long, the gun weighing 14 lbs. I now do better shooting, and at longer ranges than I ever dreamed of attempting in those days, with a 20-inch Maynard, weighing six pounds. I have a barrel of 26 inches to fit the same stock, but I can do no better work with it than with the 20-inch barrel, and prefer the latter for sporting for convenience sake, as I sling it by a strap over the shoulder, and can bring it up to an aim without unslinging. Every one who has been used to a heavy gun will complain at first that he cannot hold a light one steady, but I know by experience that a little practice will enable one to do it, and any man who knows the importance of economizing weight on such expeditions as are made in pursuit of game worthy of the rifle, will appreciate the difference on a long day's tramp between six pounds and ten or twelve, in the weight of gun.

The targets I have named afford sufficient proof of accuracy for sporting purposes. Every one of the ten shots at fifty yards would have taken a squirrel's head, as those at a hundred would have taken a patridge, and at forty rods would have been good for a deer and the sportsmen are rare who would attempt any thing better at those ranges.

Can you give any satisfactory explanation of the bursting of guns at the muzzle with ever so slight a stoppage? I have seen a very strong barrel split for an inch from the muzzle, simply from having a little light snow in it, which the owner of the gun thought could be easiest cleaned out by firing the gun; and I could tell you of some experiences of the same kind which are so surprising as almost to make one doubt the evidence of his own senses; but I am not sure that I have not already trespassed too long and will venture no further. C.

Danvers, Mass., June 22, 1866.

[The information sought for by our correspondent in regard to the bursting of guns at the muzzle, cannot now be given, but we would be glad to publish his experiences on that subject.

Magnetic Electricity.

MESSRS. EDITORS:—The new era in magnetic-electricity, so clearly predicted by Prof. Page, seems to have already dawned in a brilliant manner, and in its light the whole field of electrical science will doubtless unfold to us many of its hidden treasures. The wonderful magneto-electric machine, described in your paper of June 23d, of Mr. H. Wilde, of Manchester, England, is a realization of the proposition made by Dr. Page in *Silliman's Journal*, in 1839 (Vol. XXXV., page 252), at a time when the magneto-electric machine was hardly known. After indicating a way of increasing its power without limit by "multiplying the pairs of magnets," he says: "Nothing but the want of means has restrained me from erecting a magneto-electric machine, which I feel confident would rival the largest galvanic battery in existence." Again, in the preliminary Patent Office Report, for 1863, after summing up the achievements of the magneto-electric machine, he remarks as follows:—"From these and other cursory observations of the recent developments of magneto-electricity, flattering promises rise up in the contemplation of its future. The steam engine is hardly eighty years old, and the magneto-electric machine hardly thirty. It is only about forty years since the steam engine was fairly appreciated, and hardly a decade since the magneto-electric machine was duly recognized in the family of practical mechanics, and if its future career should be commensurate with its past, it will take high rank among the great engines of human progress."

One of the most extraordinary feats of magnetic electricity was witnessed in Washington a few days since, in the simultaneous explosion of forty torpedoes by one little magneto-electric machine not more than a cubic foot in its dimensions. The experiment was conducted by Tal. P. Shaffner, with a view to exhibit his improvements in artillery mining. The simultaneous firing of charges is a feature of incalculable value in mining; and although the assertion of Col. Shaffner, in his programme, that he is confident of firing a "thousand charges at once," seems very extravagant, yet, after the successful explosion of 40 charges with his little machine, what may we not expect in this line of progression when Wilde's improvements are introduced and the magneto-electric machine carried to its highest degrees of development? LÆDAN.

Let Americans use American Tools.

MESSRS. EDITORS:—Believing you are ever ready to advance the interests of the mechanic, I wish to say a few words through the SCIENTIFIC AMERICAN, in relation to watchmakers' tools. All the tools now used by us are imported—Swiss or English—and of very poor material and imperfect. It is impossible to obtain a good set of tools at any price. Now I wish to suggest that some enterprising Yankee go into the business, make himself rich, and watchmakers happy.

We have some splendid dentists' tools made in this country; why can't we have watchmakers' tools also?

Let some one make us a good, nice lathe, with drawing-in spindle, split chuck, etc., of some fine composition; make us a nice thing, and we will pay We also want pliers of all kinds and styles, tweezers etc., all thoroughly made, well finished, and fine temper.

This is the best chance for a smart mechanic to make his fortune, and we and our children will "rise up and call him blessed." "LYCURGUS."

St. Johnsbury, Vt., June 25, 1866.

Corrosive Action of Lead on Iron.

MESSRS. EDITORS:—The scientific man and others interested or curious can see the effects of contact of two metals, iron and lead, by examining three flights of stone stairs on the Front-street side of Fulton market. The steps are of brown stone, flanked by an iron balustrade on either side. The newel posts are iron, 1·5 inches square, and the balusters, also of iron, are 1 inch square. These are all inserted at the lower end in the stone and secured by casting lead around them in the usual manner. The upper ends are secured to an iron rail, the upper ends of which are secured to a brown-stone pillar in the same manner, the lower end to the newel post. On the top of the rails is riveted a narrower strip of iron, flat on the side in contact with the rail, the outer side rounded to make a finish.

The lower ends of these balusters, just above the junction with the lead, are, for an inch or two, reduced to a quarter of an inch, and many of them are entirely corroded or cut off, while above they are entire. Some of the newel posts, in the process of being destroyed, have, by the products of dissolution—being increased in bulk beyond the original diameter—burst the stone and now are free.—The top ends are entire, but the rail to which they were secured has suffered a great depreciation of its bulk. This seems to have taken place between the two plates of iron where they were riveted together. Here, also, we see the force of the increased bulk of the products of dissolution, as we find that the rivets are mostly withdrawn. In some that are not, we find that the mass of oxide (or whatever it may be) has forced up the top plate some three-fourths of an inch, and is there held as in a trap. The rails, where they are joined to the stone pillars, seem not to have been reduced much.

I send you a piece of one of the balusters, which you will see, was entirely cut off; though, as you will notice, it is of good fibrous iron. I also send you some of the products of the dissolution, which I forced off the iron.

The above are some of the phenomena as seen by an unscientific eye. The scientific observer would undoubtedly see much more. It would be an interesting fact to know, how long it has taken Nature to do this work. It would indicate that lead is not a good material to secure iron to stone.

Query: Is brimstone liable to the same objections? F. W. BACON.

84 John street, New York.

Long Feed.

MESSRS. EDITORS:—I write to mention a plan of preparing "long feed" for horses and cattle, which does not seem to be generally known. It is made of dry straw and green clover, and in this manner: Lay brush or poles for a stack; spread the fresh-cut clover a foot thick; on this lay the straw a foot thick, and so on, in alternate layers, until the stack is made. The juices, gases, etc., from the clover will so thoroughly permeate the straw as to prevent the clover from "firing," and make both equally good food for stock. Cattle will eat the one as readily as the other. Not only is there saving of time, etc., by the operation, but also of all those valuable parts of the clover lost in the process of drying.

J. P. LITTLE, M. D.

Richmond, Va., June 13, 1866.

[We have no doubt that this plan will make an excellent feed, and in some places where straw is abundant and cheap it will utilize what is now wasted to some extent. In this section, however, the demand for straw in the manufacture of paper is so great that it commands a higher price than hay.—EDS.

Professor Abel found that hardened steel wire dissolved in hydrochloric acid without residue, whereas, the same steel in the softened state yielded by such action a dark flocculent carbonaceous residue

How to Find Variation and Attraction of the Mariner's Compass.

MESSRS. EDITORS:—You will much oblige your humble servant by giving the following a place in your useful columns, for the benefit of mariners at large:—

A New Mode for Finding the Variation and Local Attraction of the Mariner's Compass.—Take an ordinary compass-card and erect upon its center a fine copper wire, from four to six or eight inches in hight, and perpendicular to its plane, at the moment of the sun's meridian passage, as indicated by the noon observation for latitude, note the direction of the shadow cast by the wire on the compass-card. The angle contained between this direction and that of the north and south line of the card, will give the variation and local attraction combined. Small errors are involved in this method, but the approximation is close enough for the purpose for which it is intended. MARINER.

Naval Academy, Annapolis, Md., July 3, 1866.

[The above communication was sent to us by a well-known commander in the navy, and the information given is no doubt correct.—EDS.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

ROW-LOCK.—CAPT. J. W. NORCROSS, Middletown Conn.—This invention relates to a row-lock which is mounted on a wooden bed plate and composed of metal sockets with wooden thole-pins, in such a manner that the row-lock can be sold ready mounted, and all the boat-builder has to do is to fasten the bed plate down to the gun wale of the boat, the metal portion of the row-lock with the thole-pins being secured to the bed plate so that it can be easily fastened or unfastened, thus enabling the owner of a boat to take off his row-lock when the boat is laid up ashore, and to attach the same at a moment's notice if the boat is needed for use.

CORN CULTIVATOR.—C. W. TALIAFERRO, Keittsburg, Ill.—This invention relates to a corn cultivator plow, and it consists in a novel construction of the same, whereby the plows may, with the greatest facility, be adjusted both vertically and laterally, as may be required, and a strong and durable implement obtained.

BRUSH.—R. P. GILLETT, Sparta, Wis.—This invention consists in arranging within a suitable frame, a series of parallel layers of bristles, broom-corn, or any other material ordinarily sed for brushes, with a cross block or piece between each layer, which layers and cross blocks are secured together by bolts and nuts in a novel and peculiar manner.

QUARTZ CRUSHER.—JOHN T. BONNELL, Columbia, Cal.—This invention relates to that class of quartz crushers which are provided with rising and falling weights, pounders, or stamps, and it consists in a novel and improved means for operating the weights, pounders or stamps, whereby the machine may be worked by hand with a very moderate expenditure of power.

BRIDGE.—DAVID HAMMOND AND W. R. REEVES, Canton, Ohio.—This invention relates to a novel construction and arrangement of cast-iron arches, king and queen posts, and wrought-iron string pieces, etc., in such a manner as to insure a light, strong and durable bridge.

WINDOW SASH FASTENING.—H. DE BAUN, Paterson, N. J.—This invention consists of a latch attached to one side of the window sash, in combination with a rack attached to the window frame, in such a relative position with the latch that the latter may catch into the rack, and thereby support the sash.

SHEEP-FEEDING RACK.—M. S. EVERY, Bridgewater, Mich.—The object of this invention is to so construct a sheep-feeding rack that the same may be used for feeding cut either hay or grain.

STEAM TRAP.—T. M. FORCE, Norwich, Conn.—This invention relates to a novel construction and arrangement of the trap whereby efficiency and reliability of operation and simplicity are secured.

POCKET-BOOK PROTECTOR.—CHAS. H. BAGLEY, Elgin, Ill.—This invention relates to a mode of securing a pocket-book, memorandum book, bill holder, or the like, in a person's pocket, in such a manner as to frustrate any felonious attempt to abstract the same but, at the same time, which will not hinder the owner of the pocket-book from withdrawing it whenever occasion requires.

BEE PASSAGE AND PROTECTOR.—JAMES WASH, Mount Sterling, Ill.—This invention is designed to protect bees from the moth by preventing their entrance into the hive, and to this end the invention consists in the employment or use of a tube applied to the hive in such a manner that the entrance will be at some distance from the hive, and having the latter provided with decoys composed of openings covered with wire gauze, these openings being directly over vats or receptacles supplied with grease or any substance which destroy the millers as they drop into it.

INSECT PROTECTOR.—SAMUEL CLARK, New York City.—This is a device for protecting bedsteads from bedbugs and other crawling insects. It consists in placing a thin band or annular pendent projection within an united cup-shaped base, one being provided for each leg or foot of the bedstead to rest upon, so that the bugs cannot pass from the floor up the legs of the bedstead.

BLACKSMITHS' FORGE.—JAMES PATTERSON, New York City.—This invention consists in having the bed of the forge upon a hollow base provided with a perforated valve, and having the nozzle of the bellows entering it, whereby the hollow base is made to perform the double function of a wind chamber and an axle receptacle, and two important results attain—an uniform or even blast supplied to the fire—sudden gusts or puffs, being avoided—and ashes, dross, etc., very readily abstracted from the fire whenever necessary.

CARRIAGE DOOR HINGE.—GEORGE W. BEERS, Bridgeport, Conn.—By means of this hinge the carriage door may be securely attached to the side of the door way, and yet be readily removable when desired. The invention consists in the combination of plates and a catch with the swinging arm of an ordinary concealed carriage door hinge, and with the edge of the door.

BROOM HEAD.—JOHN H. LIGHTNER, Shirleysburg, Pa.—This invention consists principally in attaching toothed bars to the inner sides of the cap; in hinging a portion of the sides of the cap to its upper part; and in securing the parts of the broom head to each other and to the corn by a band slipped down over the broom head for that purpose.

NAILS AND TACKS.—RACHEL SPEER, Passaic, N. J.—This invention relates to that class of fastening by which two or more articles or pieces of any material are secured to each other by driving the fastening through them.

LOCK FOR MAIL BAGS, CARPET SACKS, ETC.—JOHN B. LOGAN, Thornton, Ind.—This invention consists in a peculiar arrangement of bolts and catches, whereby a rapid opening and closing of the bag or sack is insured, which, when locked, will be secure and reliable.

OILER.—GEORGE J. CAPEWELL, West Cheshire, Conn.—This invention consists in providing an ordinary spring-bottom oiler with a tube extending from the nozzle to near the bottom of the oiler, where it has attached to it, by a swivel joint, another tube nearly at right angles with it and turning by its own weight in a plane parallel to the bottom, so that the end of it is always near the side of the can which is lowest.

WATER ELEVATOR.—J. C. BARRETT, Stamford, Conn.—This invention consists in a novel application of the "lazy tongs" system of levers for elevating water for domestic use, and it consists in the means employed for actuating the system of levers and in the means for tilting the bucket.

SCREW WRENCH.—A. M. OLDS, New York City.—This invention consists in the arrangement of a spring tooth bearing at one end against a shoulder of the movable jaw of a screw wrench, and at the opposite end against the shank of the wrench in such a manner that if an attempt is made to slide the movable jaw down, the spring tooth catches firmly between its bearing points and the jaw is locked; but in moving the jaw toward the stationary jaw the spring tooth is released and permits this motion without obstruction.

CHURN.—EDWIN HOYT, Stamford, Conn.—This invention consists in a novel device for holding the dasher rod while being operated, whereby it can be quickly released for removing the dasher from the churn; and it also consists in a novel construction of the dasher whereby a better effective power is obtained for agitating the cream.

CANE-JUICE EVAPORATOR.—JOHN F. RIGGS, St. Joseph, Mo.—In this invention the evaporator pan is made of cast iron and arranged with ledges or flanges protruding from the sides alternating so as to form a transverse channel.

STAMP MILL.—ALEX. HENDLEIN, Egan Canon, Nev.—This invention consists in the arrangement of double-armed levers, the long arms of which are about ten times longer than their short arms, in combination with the stamper and with suitable cranks or eccentrics on the driving shaft, in such a manner that, by the assistance of the double-armed levers, the operation of raising the stamper is facilitated and the number of blows of each stamper can be increased almost to any desired number per minute without danger of having the wipers come in contact with the descending tappets.

TOOL FOR FINISHING AUGER HEADS.—RUSSELL JENNINGS, Deep River, Conn.—This invention consists of a rotary wheel of a peculiar shape, whereby the workman is enabled to apply the auger to the wheel and manipulate the former in such a manner that all parts of its cutting portions, necessary to be operated upon, may be brought in contact with the tool and the work performed in an expeditious and perfect manner.

HEAD BLOCK.—C. LEFFINGWELL, Clarksburgh, Ohio.—This invention consists in the construction and arrangement of the pawl blocks, and the combination of the rods, levers, and racks, by means of which the knees of the head blocks are worked with each other, and with the movable pawls.

TABLE-LEAF SUPPORT.—L. R. CAVENDER, Eureka, Ill.—The object of this invention is to furnish a simple, convenient, and safe support for a table-leaf. It consists in the combination of a pivoted arm, a spring, and a cord, with each other, and with the frame of the table.

SHIP'S WINDLASS.—JOHN S. GETCHELL, Machias, Me.—In this improvement the ship's windlass may be worked with increased power, or increased speed, as desired, and it consists in the combination of two sets of single or double pawls and bent-lever stops with each other, with the ratchet wheels of the windlass, and with the operating levers.

CULTIVATOR.—A. M. BLACK, Auburn, Ill.—The object of this invention is to provide a frame-work and operating movements which have the qualities of great simplicity, cheapness, and efficiency.

HEATER.—NATHANIEL A. BOYNTON, New York City.—This invention relates to that class of stoves which are commonly called heaters, and it consists in providing a novel course for the products of combustion on their way to the exit flue.

GATE.—CHAS. DIXON AND S. H. CLOSE, Port Byron, N. Y.—This invention consists especially in the construction and combination of the spur wheel, shaft, and bevel gear wheel, so that the first effect, upon operating the levers, is to unlatch the gate, and the second effect is to swing it open or shut.

MILK RACK.—ALBERT JACKSON, Clifton Springs, N. Y.—This milk rack is so constructed as to afford a sure support for the milk pans, and to guard against their slipping off when the rack is revolved; and it consists, principally, in the combination of ring guards with the supporting arms and wires

PLOW.—T. E. C. BRINLY, Louisville, Ky.—This invention consists in constructing the mold-board with a point having a hook or shoulder at its under side to fit over the front end of the land side, whereby a smooth, unbroken surface is obtained at the upper side of the mold-board, and no opportunity allowed for weeds and trash to catch and collect on the point. The construction of the plow is also much simplified.

Notes and Queries

C. C. H., of Mass.—The velocity of water in falling is the same as that of other falling bodies. One pound of water in falling one foot would do one foot-pound of work if all its power could be utilized, and no lever or other device can make it do any more. Practically the best turbine will utilize 91 per cent of the power, good breast and over shot-wheels, between 70 and 80 per cent. It is always best to take the power on a breast wheel from the circumference. With gears, pulleys, and other mechanical devices, it is an invariable law that what is gained in power is lost in speed.

A. J. T., of Ohio.—Breast wheels are generally run with a velocity at the periphery of six to seven feet in a second

W. P., of N. Y.—The lateral pressure of water is a little more than half a pound per square inch for each foot in depth, being 15 pounds at the depth of 34 feet. We should make a dam like yours 13 feet thick at the bottom, and lay the upper side in cement to a thickness of 2 feet.

G. W. P., of Conn.—By turpentine varnish in the laquer receipes is understood copal varnish diluted with spirits of turpentine.

F. M. L., of Pa.—It would seem to be a simple matter to regulate the rise and fall of the weight by a governor but from the incomplete description you give it is hard to form a proper opinion.

J. E. B., of Mass.—You understood us precisely—we did not mean to ridicule the question. In regard to the question, "Which is the mother of the chicken, the one that lays, or the one that hatches the egg?" we refer you to Ralph Waldo Emerson.

S. W. W., of S, C.—Rosin is bleached by melting in a suitable vessel at a temperature of not more than 600 deg and passing steam through the fluid mass. The steam and rosin are then condensed in a receiver and the product dried. Carbonic acid, or a mixture of carbonic acid and nitrogen or hydrogen gas, are introduced sometimes, to perfect decolorization. Rosin oil is one of the products of destructive distillation of rosin, the residuum being tar.

J. M. M., of Conn.—We are not aware that Arago's plan for proving the theory of light, has been tested. The undulatory theory is becoming recognized and accepted. The calcium light is not polarized. We cannot tell whether laying a razor aside for some months will restore its quality of holding an edge or not. The experiment can be tried.

A. B., of Mass.—Your transfer ink, judging from your description, is probably a lithographic ink, composed of tallow, wax, and soap, each 4 oz., shellac 8 oz., gum mastic, 2½ oz., black pitch 1½ oz., and lampblack. To your inquiry: "does a piece of cloth colored with an aniline dye fade on exposure to sunlight?" we reply, that much depends on the nature of the fabric. Silk or woolen will retain an aniline dye very well, but cotton, being a vegetable, must be albumenized or animalized to receive the aniline. Sunlight affects these dyes more than madder and some other dyes.

J. S. R., of Pa., asks if there is such a thing as a suction fire engine, how far it will supply itself, and where it can be got, and the price? There was a time when the tank of fire engines were filled with buckets by hand, but they have gone the way of the hand-card and old fashioned spinning wheel. All fire engines, hand and steam, are now built to elevate their own water by what is commonly called suction that is the elevation of water by atmospheric pressure in a vacuum. The supply keeps pace with the delivery through the forcing pipe.

R. N., of Nebraska.—The only receipe we know of for restoring burnt steel is to work it repeatedly at a low heat and even that won't do sometimes.

K. R. P. of Ind.—When the furrows are laid off in a mill stone, the miller strikes a circle near the eye and another near the verge of the stone, he then draws lines from the circumference of the small circle to points on the large one, the angle, or, more properly, the lead of these lines, constitutes the draft of the furrows.

T. G., of Canada.—Your proposition in hydraulics is not of sufficient general interest to warrant its publication It would better suit the columns of *Silliman's Journal*.

I. C. T., of Del.—Refer to Vol. XI., pp. 295 and 373 for rule to find gears for lathe screw cutting. We have published this rule so many times we dislike to produce it again. You will find a hint also in our reply to T. R., Sing Sing in No. 26, Vol. XIV., page 420.

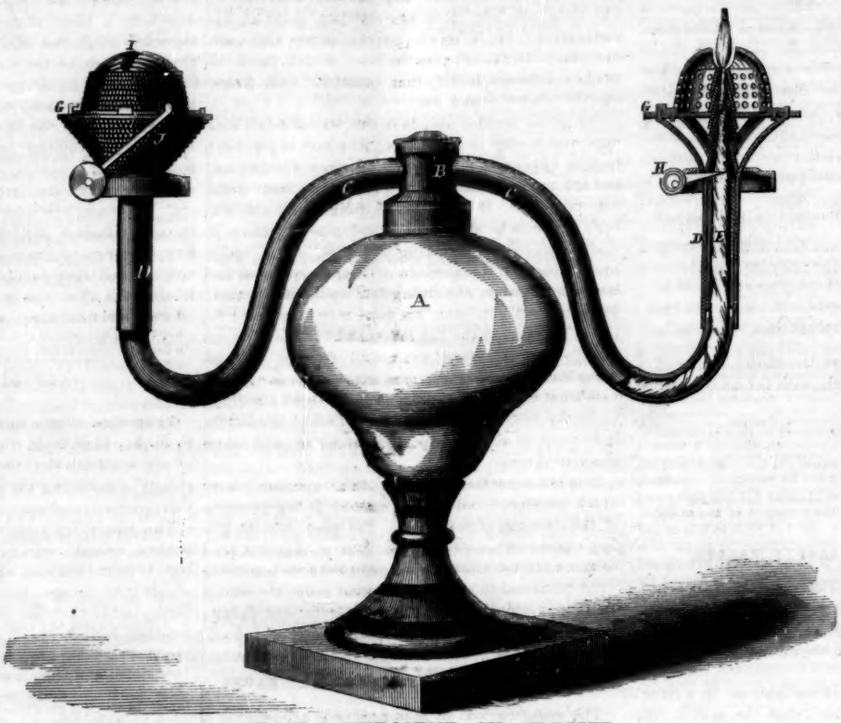
SPECIAL NOTICES.

L. C. Q. Wishart, of Philadelphia, Pa., has applied for the extension of his patent for ornamenting bottles. The petition is to be heard on the 8th of October next.

Lorenzo L. Langstroth, of Oxford, Ohio, has petitioned for the extension of a patent granted to him on the 6th day of October 1852, and reissued on the 26th of May, 1863, for an improvement in Bee Hives. The petition will be heard on Monday the 17th day of September, 1866.

Lamp Chandelier for Burning Kerosene.

The difficulty of utilizing all the light from the common kerosene lamp is well known. If the light is required to be concentrated upon one spot, a shade is necessary, and then the shadow of the lamp interferes with the projection of the light. The usual lamp top also prevents a thorough combustion of the oil, from the inability to supply the flame with sufficient oxygen, thus requiring the use of a chimney to create a draught. The object of the improvements here illustrated, is to remedy these defects in the ordinary lamp, and to derive the maximum amount of light from the minimum of oil.



ADAIR'S KEROSENE CHANDELIER.

A represents an ordinary lamp, receiving in the top, in lieu of the usual cone, a cap, B, sustaining two branches, C, which are provided with larger tubes, D, at their extremities. These branches contain a wick, E, which can be met by that from a common burner, or extended, as at E, to the top of the tube. This branch shows a burner requiring no chimney. The tapering tube, F, is made of a sheet of metal, wound spirally, the edges overlapping, and the aperture at the top compressed to flatten the wick, thus presenting a large surface to the action of the atmosphere. The lower portion of the burner is formed by splitting the tube, D, longitudinally, and spreading the parts, which are secured in their expanded form by a circular plate, G. The spur, H, works eccentrically, entering the wick and, by a sliding motion, raising or depressing it, and then leaving it when the operation is performed. The cone, I, is corrugated at the top by lines running obliquely toward the opening, by which means the air traverses across the flame, spreading it over a larger area, and increasing the amount of light. As an addition to the brilliancy of the light, the cone is covered with an open jacket of glass beads, shown at J. The advantage of the spiral tube, F, is that the heat from the flame cannot pass directly down toward the oil, thereby rapidly volatilizing it, but is compelled to follow the spirals.

These are among the principal advantages claimed for this improvement, but there are other and different applications of the improvement which can be advantageously employed in many forms. Patented Oct. 13, 1863, by James Adair, Pittsburgh, Pa., to whom apply for rights and for further particulars, care of Hussey, Wells & Co.

Trial of One of the New Frigates.

The *Chattanooga*, one of the new steam frigates built to attain great speed, has had a trial trip at sea, and has performed well. She attained a speed of 15¼ statute miles per hour under steam alone. The amount of coal burned was 12,000 pounds per hour, and the engines, which were built by Merrick & Sons, of Philadelphia, averaged 44½ revolutions per minute, the highest number being 52. The diameter of the cylinders is 84 inches by 48 inches stroke.

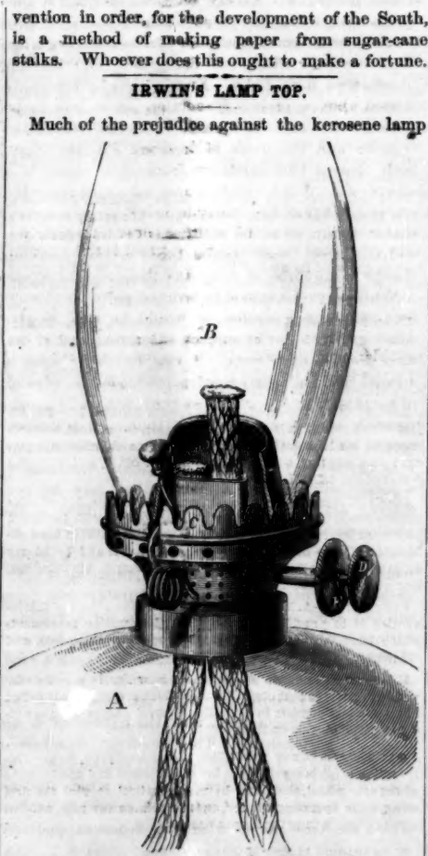
We hope soon to be able to give full details of the *Madawaska's* engines designed by Capt. Ericsson. They are expected to achieve great results.

Thread from Cotton-Plant Stalks.

An ingenious person in New Orleans has been engaged in making thread from the stalks of the cotton plant. It is very fine and strong, and looks very much like flax, being nearly as soft and pliable. He proposes to make this thread into cloth, which he says will be as strong and durable as that made from cotton itself. Forty pounds of thread can be made from one hundred and twenty pounds of stalk. A new factory will soon be established for the manufacture of cloth from this substance. The discovery is not a new one. It has been known for several years that there was a fibrous substance in the cotton stalk which very much resembles flax, but it has never before been put to practical use. Should this prove successful, it will double the value of the cotton plantations at the South. The next invention in order, for the development of the South, is a method of making paper from sugar-cane stalks. Whoever does this ought to make a fortune.

IRWIN'S LAMP TOP.

Much of the prejudice against the kerosene lamp arises from the difficulty of keeping the wick in proper trim, so that the flame shall be even and give the largest amount of light without smoke. Even the most practiced hand frequently fails to cut the wick aright, and when the lamp is lighted, a stream of flame and smoke shoots up on one side, while the other side burns dimly. The annoyance of removing the heated chimney to repair the defect, the repeated failures, and the danger of cracking the glass, make together quite a sum of vexation.



The improvement illustrated herewith is designed to remedy these difficulties. Instead of one flat wick, two of half the usual width are used and moved independently of each other. A is the lamp; B is the chimney; C is a lamp top of the usual form, but having a double instead of a single feeder. D is the head or button of one feeder, furnished with the usual spur inside the wick tube, which raises one wick, and E is another secured to a sleeve that rotates on the shaft of D. This is also furnished with a lifting spur which moves the other wick. Either of these wicks, therefore, may be raised or lowered independent of the other, or both may be moved together by grasping both disks at the same time. A third spur can be used for a treble wick, the disk or button projecting from the opposite side of the top.

Patented Feb. 14, 1865 For further particulars address Lewis Hover, 50 State street, Chicago, Ill.

The Trichiniasis.

Our attention has been called to a very able paper on this subject by James C. White, M. D. published in the Boston *Medical and Surgical Journal*, which confirms the correctness of the idea that pork, raw or partially cooked, is unfit for food. The presence of trichinæ in pork, he says, can only be recognized by its effects on those who eat it, or by microscopic examination.

The well-authenticated account of the death of several members of a family in Marion, Linn county, Iowa, from trichiniasis, caused by eating raw ham, ought to be a sufficient warning against the use of pork in an uncooked state. It seems, from this account, that salting and smoking is not sufficient to destroy these parasites. The only member of the family who escaped illness was one who had not partaken of the ham. It was discovered that the hogs which furnished the bacon had been afflicted with the "hog cholera," but being supposed to have recovered, were fatted and killed. The connection between "hog cholera" and trichiniasis seems thus to be sufficiently well established to render the flesh of diseased hogs a dangerous article of food.

Locomotive Boilers.

We believe our Yankee brethren make an engine better adapted to rough, and even to ordinary lines, than our own, and, on the other side, we consider our engines simpler and stronger for their work. A Yankee boiler would burst, by hydraulic pressure, long before ours would give way, and yet they carry as high steam as we do.—*Engineering.*

VANILLA.—A successful effort, it is said, has been made to raise this plant in France. The experiment was made in the public gardens of the St. Bruno, and the quality is affirmed to be equal to the best imported from the West Indies. The seed of the vanilla is remarkable for its fragrant odor, and yields an oil which is much used as a flavor. It is also employed in medicine in place of valerian, all the virtues of which it is supposed to possess, while it is at the same time far more grateful to the taste

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NEW YORK, SATURDAY, JULY 14, 1866.

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MAN-HOLES AND SAFETY VALVES.

The Boiler Insurance Company, of Manchester, England, whose proceedings we so often notice, because they are doing a good work, have made a monthly report from which we extract certain parts of interest to our readers.

In the course of certain investigations, in a recent catastrophe, they discovered that the seat of the disaster was the man-hole. The boiler itself was quite a small affair, being only five feet and three inches high, two feet and four inches diameter, composed of plates one-fourth of an inch in thickness. The pressure carried was eighty pounds to the square inch, and the boiler was warranted for one hundred and fifty pounds.

The boiler failed at the man-hole, which was without any saddle or casting to strengthen it. The vents were three in number, diverging like cracks in a pane of glass, one running round a seam of rivets, and completely stripping off the external shell, which was blown into fragments.

The jury, who were probably instructed before, had brought a verdict that the explosion was caused by the absence of the saddle plate or casting which is to be found on all properly-made boilers. The boiler in question was only six months old.

In addition to the bad construction of this boiler, as regards the omission alluded to, the jury called attention to the dangerous character of the safety valve. This was a small valve 1¼ inches in diameter, loaded by a spiral spring in such a manner that it was equal to a percussion cap in a charged shell, or in other words, was so utterly unreliable as to be worse than no valve, as will be seen from the following details:—

The spring that held the valve was checked at the top by a yoke which passed over two standing bolts—one on each side of the seat. This yoke was secured by nuts, and no provision existed for regulating the tension of the spring so that the amount of pressure could be known. It was found that one turn of the nuts would increase the pressure from 80 to 150 pounds. Moreover, the spring was of so stubborn a character that at the point of blowing off, the steam barely wheezed through without raising the valve perceptibly. This valve, and the error of cutting a large hole in the boiler for the man-hole plate, was the cause of the "accident."

We have repeatedly shown, by argument, by facts, and by illustration, that vague and unsound theories concerning boiler explosions are of no value whatever in ascertaining the cause. Men committed to certain views go prepared and indeed eager to find something in the accident to corroborate their assertions, and they generally succeed in so mystifying the matter, if called upon to testify in court, that neither they nor the jury have the slightest idea what they are talking about.

But let a practical man go and look for evidences of weakness, for proofs that the boiler has been misused, or badly constructed, and he will find natural causes for the explosion. The safe load of a boiler plate, per square inch of section, has been ascertained; why then not take that as a starting point for investigation? Or, if this be proven correct, there are the many faults of construction, which tend to weaken a steam boiler, that practical men know exactly where to look for.

One great trouble stands in the way of a full and impartial verdict in such cases. If a jury of practical men be impanneled, they are tradesmen themselves, and are naturally bound by trade ties to keep trade defects secret. If John Smith judges of his neighbor's boiler as he should, and condemns it because it was chisel-cut in caulking, because it was badly braced, because it was made of thinner iron than the laws which govern the strength of materials demand, he knows not how soon his turn may come, and he be the prisoner at the bar instead of "the intelligent jury." It is, therefore, not at all strange that so many men of sound common sense, who say in private what they cannot say in a verdict, lend a willing ear to the voices of those who sing of ozone, of electric influences, of the decomposition of water, and other obsolete theories.

It is not a matter of any man's "opinion" how much pressure a boiler will stand. It is a question of the strength of materials. The plan of cutting a huge piece out of a boiler, without adding any protection to it, is manifestly an error that we believe is little practiced in this country; and as for the safety valve, experience shows that the lever and weight is entirely reliable when properly made and cared for.

BUILDING OF ROADS FOR COMMON TRAVEL.

The usual custom of making roads by covering a substratum of common soil, sand, or even turf, with coarse gravel left loosely on the surface, is one which is anything but economical or wise. A prolonged storm—occasionally a violent shower—gullies the roadway, washing off the gravel, and leaving treacherous mud holes. Even where broken stone is used upon a proper foundation, it is left to be consolidated and compressed by the wheels of vehicles and the hoofs of horses. The tax upon both horses and carriages from this cause is a severe one. It is a vexation and a hindrance to the traveler. Again, the roadside is left in such a state that in a rain, or at the melting of snows, pools form and ultimately wash across the roadway, making chasms dangerous to cross and expensive to repair.

While so much is said in favor of permanent ways for steam transportation, it would be well to give some attention to the subject of improving our common roads and streets. It can be easily demonstrated that, on poorly constructed roads, the expense of keeping them in repair so they will be in proper passable condition, is greater than the additional cost of building the road at first in a correct manner. It is unnecessary to speak now of the foundation of a good road. That is a matter that may be considered at some future time. The surface is the portion to which we wish to direct particular attention. Where proper stone for breaking is not readily attainable, and the cost of preparing it is too great to be incurred, gravel, measurably free from soil and sand, is the best substitute for a roadway surface. But spreading this material, however thickly, over the foundation is not making a road. A bed of loose gravel or broken stone is a poor way for horses and carriages. But just consolidate this material by compression, and the nature of it appears to be changed. The yielding, treacherous surface, which gives no reliable fulcrum for the horse's feet, becomes a firm floor over which the carriage or heavily-loaded team rolls smoothly, and on which the horse moves with a much less expenditure of muscular exertion.

The plan of rolling the roadways is now largely adopted in England and France. For this purpose, in England, rollers are used of ten and twelve tuns weight, drawn either by horses or traction engines. In France they use a roller with locomotive attached, having a power of about ten horses. The result is to consolidate and solidify the material, until, although greatly differing from an unyielding surface, it is sufficiently homogeneous and enduring to resist the action of the elements and the wear of travel. Undoubtedly immense rollers carrying the weight of engine and boilers are the most effectual, yet we cannot see why rollers capable of being drawn by a team of horses might not be advantageously employed on our common roads in more than one stage of the process of road-building, but especially in finishing the surface. The cost of the rollers could not be very great, and it would soon be saved in the lessened expense for repairs. Roads in the country are generally made and repaired by the towns, or at the expense of the counties, under the direction of county commissioners. Let each town, or the commissioners, provide suitable rollers at convenient points to use on different sections of the roads, and although the first cost of road construction might be somewhat enhanced, the after repairs could be easily and cheaply effected when required, which would not be so frequently as now.

CANADIAN PATENTS.

In another column our readers will find an article upon the above topic, copied from the *Quebec Gazette*, which sets forth that the Canadian Parliament is seriously considering the policy of relaxing somewhat their present exclusive or one-sided patent system.

The editor truly says: "This is a sort of stock subject, which comes up session after session," but hitherto without success. American inventors wishing to secure their inventions from wholesale piracy in the Canadas, have been tantalized, year after year, with hopes of speedy reform, which would enable them to protect their rights in those Provinces; but the hope has been deferred from year to year, until the delay seemed likely to wear out human expectation.

We would not be premature in the matter, but trust we shall soon be able to announce that our citizens can secure their just patent rights in Canada.

The *Gazette* admits that the Canadians have pirated our inventions, but as an off-set, hints very strongly that our people have stolen some inventions from Canada—which is possible, though it seems hardly probable. We will, however, consent to square accounts on this point, if our non-reciprocal neighbors will only hurry up their scheme of relaxation so as to admit Americans, Frenchmen, and Chinese to patent-right privileges.

A Theory in Regard to Rinderpest, Pleuro-Pneumonia and Cholera.

A communication has been received at the Department of State, from our legation at London, inclosing two pamphlets relating to certain experiments by Dr. James Dewor, of Kirkcaldy, Scotland, for testing the efficacy of sulphurous acid gas as a disinfectant. Results are cited which lead to the conviction that the diseases—cholera, rinderpest, pleuro-pneumonia, and others—may be not only very much modified, but even wholly prevented by this means.

The method of generating the gas is very simple and inexpensive. It is only necessary to have a chaffer of red-hot cinders. Set a small crucible into them and drop a piece of sulphur stick about as large as a man's thumb into it. This will fumigate a large cattle shed in twenty minutes.

The animals seem to enjoy it, and it acts as a tonic on man and beast. The shed must be well ventilated during the fumigation, as well before as after it, and sanitary rules must be enforced in regard to cleanliness, removal of dung heaps, etc. During the prevalence of such epidemics as are above named, the fumigation may be made according to the foregoing directions four or five times a day; and not only is this treatment said to cure these diseases, but it is stated that mange, ringworm, and lice have also vanished before it, and that grease heels in horses have also been cured by it, while severe cases of phthisic and tubercular affections of the lungs have also been relieved in human beings.

Patent Claims

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JULY 3, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

55,973.—EXTINGUISHER FOR LAMPS.—Charles E. Abbott, Boston, Mass.:

I claim the tube, c, with its lid or cover, d, and rack, g, or equivalent, operated by the toothed wheel, h, upon the rod, C, substantially as set forth.

55,974.—PAPER AND CLOTH BOSOM.—Charles Arnold, Chicago, Ill.:

I claim a bosom with cloth front and paper back, when secured together substantially as described and used for the purpose set forth.

55,975.—OIL-CAN.—James Ashton, Fall River, Mass.:

I claim the combination of an air inlet, I, I, I, supply-tube, T, T, dripping-chamber, Y, Y, spiral-spring, S, shut-off rod, A, B, valve, V, and rod, C, D, all as applied to an oiler or oil-can, in the manner described and for the purposes set forth.

55,976.—DROP-HAMMER.—Jefferson Aughe, Dayton, Ohio:

I claim, 1st, The mode of connecting a die to the ponderous hammer, E, of a swaging machine, substantially as herein described and represented.

2d, The arrangement of the dies, F, F′, the hammer, E, and bolt, G, substantially as described and for the purposes specified.

55,977.—WATER-ELEVATOR.—A. S. Babbitt, Keeseville, N. Y.:

I claim the arrangement of the wheels, D and B, the wheel, B, being provided with a hub upon which cams are formed, with the lever, A, which is also provided with cams to correspond with, those upon the wheel when used with the springs, E, E′, and collar, F, as and for the purposes specified.

55,978.—CURTAIN FIXTURE.—Henry O. Baker, New York City:

I claim the lever-button, in combination with the perforated side of the frame, substantially and for the purposes herein set forth.

55,979.—HAY-RAKER AND LOADER.—Horace Baker, Cortland, N. Y.:

I claim, 1st, The rake-teeth, P2, in combination with two positively actuated endless aprons, W, W′, revolving in opposite directions, and so placed in relation to each other that the cut grass raised over the teeth shall be seized between the aprons and elevated, substantially in the manner set forth.

2d, The standards, T, T, when so constructed that by their elasticity they shall maintain the aprons, W, W′, face to face, and permit variations in the quality of grass carried between them, substantially as set forth.

3d, In combination with the endless aprons, W and W, I claim the guides, T2 and T′, when attached to the standards, T, T, and so constructed as to carry the cut grass over and beyond the endless aprons, substantially as set forth.

4th, The driving-wheel, B, and cap-shaped wheel, C, constructed as described, in combination with the spur-wheels, G, H, and E, substantially as and for the purpose set forth.

5th, The shoe, y, in combination with the wheel, Y, and roller, x′, arranged substantially as and for the purpose set forth.

6th, The combination of the teeth, P2, shaft, N, and rollers, P3, substantially as and for the purpose set forth.

55,980.—WATER-ELEVATOR.—J. C. Barrett, Stamford, Conn.:

I claim, 1st, The lazy tongs, B, in combination with the lever, D, provided with the rocker, E, all being arranged substantially as and for the purpose set forth.

2d, The pendant rod, I, provided with the cross-head, j, and attached to the lazy tongs, in connection with the lip, k, on the bucket, substantially as and for the purpose specified.

55,981.—SASH-FASTENING.—H. De Baum, Paterson, N. J.:

I claim the combination of the case, E, latch, D, and spring, e, operating with the rack, C, when constructed and arranged in the manner and for the purpose herein specified

55,982.—WASH-STAND.—Alfred Bayley, Newark, N. J.:

I claim as a new article of manufacture a portable metallic wash-stand, constructed and its parts arranged substantially as described.

55,983.—BEVERAGE.—George Beck, Rochester, N. Y.:

I claim the production of a beverage by the mixture of wine or other similar fermented liquor with water, in the proportions set forth or thereabout, and the addition of sugar to produce a secondary fermentation, to be conducted and continued in a close vessel; so as to retain the gases produced thereby, for excluding the air and expelling the beverage in an effervescing state, substantially as and for the purpose herein specified.

55,984.—PLOW.—Solomon Beckett, Olive Branch, Ohio:

I claim, 1st, The sheathing plate, B, fitted and secured to "mold-board," A, of a plow, for the purpose above described and set forth.

2d, The sheathing plate, B, in combination with cutter, C.

55,985.—CARRIAGE SPRING.—B. M. Beckwith, Plattsburg, N. Y.:

I claim the boxes, F, applied to the hind axle and bolster of a buggy to admit of the attachment of the springs and permit their extremities to vibrate about the points of support, substantially as and for the objects specified.

55,986.—WASHING MACHINE.—Ormus D. Beebe, Beaver Dam, Wis.:

I claim, 1st, Securing the slats, c, c, within the tub, upon the metallic bottom, by having them extend under or mitering with the sides, A, A, substantially as and for the purposes herein set forth.

2d, The combination of the metallic bottom with the slats, c, c, lying thereon, and mitered with the sides, as herein set forth.

55,987.—CARRIAGE HINGE.—George W. Beers, Bridgeport, Conn.:

I claim the plates, E and G, and the catch, F, constructed as described, in combination with the swinging arm of an ordinary concealed carriage door-hinge, substantially as described and for the purpose set forth.

55,988.—IMPLEMENT FOR GROOVING THE MOUTHS OF GLASS BOTTLES.—Edwin Bennett, Philadelphia, Pa.:

I claim the application to a glass-blower's bottle-clamp of the toothed wheels, C, E, the same being arranged and operated substantially as and for the purpose described.

55,989.—CAR-COUPLING.—William Bergmann, Philadelphia, Pa.:

I claim the casings, A and A′, with their dogs, H, H′, levers, F, F′, and links, M, M′, in combination with the within-described devices, or their equivalents, for operating the levers and securing the dogs, the whole being constructed and operating substantially as and for the purpose specified.

55,990.—CRADLE AND CHAIR.—Alois Berny, Williamsburg, N. Y.:

I claim a chair provided with a hinged additional seat, additional back, and hinged additional arm-pieces, said seat being made to swivel on its frame, D, and the arm-pieces being secured to each other, and to the seat, A, by catches, c, and screw, e, or other equivalent fastening, substantially as and for the purpose described.

55,991.—CLOTHES-TONGS.—John T. Bever, Bethel, Ill.:

I claim, as a new article of manufacture, the within-described clothes tongs, to wit, a pair of wooden tongs furnished at their ends with united wooden hemispheres, as described.

55,992.—GIB FOR CROSS-HEAD.—William R. Bishop, Sherwood, Wis.:

I claim a gib composed of a metal body, A, and strip of leather, a, substantially as and for the purpose described.

55,993.—CULTIVATOR.—A. M. Black, Auburn, N. Y.:

I claim, 1st, The pole, a, having a cross-bar, A, rigidly secured thereto, and a frame-work composed of the plow-beams, B, B, with cross-pieces b, b′, pivoted to the ends of said cross-bar, A, substantially in the manner and for the purpose specified.

2d, The cross-bar, A, plow-beams and frame, B, B, b, b′, the adjustable prop, c, and lever, H, all arranged and operating in the manner and for the purpose set forth.

3d, The hook and eyebolts, f, f, which project from the inside of the plow-beams, B, B, and fasten the standards, m, m, to beams, B, B, the connecting-rod, g, eye and rod fastening in cross-piece, b.

55,994.—GAS-PURIFIER.—Richard C. Bocking, Indianapolis, Ind.:

I claim, 1st, The combination of the liquid reservoir, tube, B, and the wheel provided with vanes having reticulated surfaces, and revolving on a horizontal axis under the impulse of the entering gas, substantially as described.

2d, The mode of having the said wheel in orifices in the sides of the chamber, capped on the outside, as described.

3d, The combination with the series of reticulated vanes of the bands, supported on the vanes by the pins or equivalent means.

55,995.—QUARTZ MILL.—John T. Bonnell, Columbia, Cal.:

I claim the drum, C, provided with ratchets, D, D, and a pendant rod, A, with a weight or bob, o, attached, in combination with the spur-wheels, E, E, placed loosely on the shaft of drum, C, and provided with pawls, F, to engage with the ratchets, D, the above parts being used in connection with the pinions, I, I, on the shafts, J, J, which actuate the weight or pounder-rods, L, substantially as and for the purpose specified.

55,996.—CHURN.—Jacob Boyers, Orrville, Ohio:

I claim, 1st, The oblique shaft, C, as arranged in its connection with the dasher-shaft, D, by means of the curved plate, b, and staples, b′, as to give an oblique or nearly rectilinear rotary motion, when operating substantially in the manner and for the purpose herein set forth.

2d, The retention of the rod of the oblique shaft, C, in its axis by the flexible rod, E, and pivot, c, as arranged and applied substantially in the manner and for the purpose as herein set forth.

3d, The movable slide-plate, F, strips, e, e, and bridge-plate, d, in its connection with the dasher-shaft, D, as arranged substantially in the manner and for the purpose as herein set forth.

4th, The flexible rod, f, pin, f′, and catch, g, for retaining the slide-plate, F, when in operation, substantially in the manner as arranged and for the purpose as herein set forth.

5th, The disk, a′, and air-tube, a, as arranged in combination with the lid, B, substantially in the manner and for the purpose as herein set forth.

55,997.—COAL STOVE.—Nathaniel A. Boynton, New York City:

I claim the combination of the flanged fire-chamber, B, cylinder, C, cylinder, D, with perforated bottom, K, forming an annular space, E, air flues, F, semi-circular flue, G, and exit flue, H, all arranged and operating in the manner and for the purpose herein described.

55,998.—BEEHIVE.—Joseph Bradt, La Porte, Ind.:

I claim the arrangement of the doors, B and E, flap, d, incline, plates, g, g, comb frames, F, and hinged cap, A, substantially as and for the purposes set forth.

55,999.—PLOW.—T. E. C. Brimly, Louisville, Ky.:

I claim a plow provided with a point, E, welded, rolled, or otherwise formed or permanently secured to a steel mold-board, with a hook or shoulder, b, at its under side to fit over the front end of the land-side of the plow, substantially as herein shown and described.

56,000.—HAY RAKE.—Hiram Brown, Cape Elizabeth, Maine:

I claim the combination and arrangement of the frame, A, connecting-rod, B, arm, C, and hinges or bands, D, attached to the tongue and head of a rake, as herein set forth, and operating as and for the purposes described.

56,001.—WASHING MACHINE.—William Burnham, Union City, Mich.:

I claim, 1st, The employment of a revolving tub, C, in combination with the fluted conical rollers, R, R, which rollers operate against the clothes by spring pressure, and are arranged relatively with and connected to the frame of the machine, substantially in the manner and for the purpose herein specified.

2d, The combination of the band, M, pulley, P, P1, and P2, with the machine frame and tub-shaft, D, substantially as and for the purpose set forth.

56,002.—APPARATUS FOR RAISING BREAD.—Ezra Buss, Springfield, Ohio:

I claim, 1st, A box or chamber, A, for receiving the dough to be raised, when provided with a close vessel filled with heated water for communicating a very gradual, continuous, dry heat to the atmosphere within the chamber, and arranged and operating substantially as herein specified.

I also claim locating the hot-water vessel, H, in a drawer, G, closed except at the top, and provided with apertures near the bottom, substantially as and for the purposes herein set forth.

I also claim providing the chamber with an opening, C, controlled by a valve, c, for the purpose of admitting fresh air therein and of regulating the temperature inside, as herein described.

I also claim the opening, D, in the top controlled by a valve, d, for the purpose specified.

I also claim the use of a thermometer, a, in connection with the apparatus, arranged substantially as specified.

I also claim the use of the glass, b, in the door or side, for the purpose set forth.

56,003.—LEEWAY INDICATOR FOR VESSELS.—Thomas Byrne, New York City:

I claim an apparatus for indicating the leeway of a vessel, consisting of a graduated plate attached to an oscillating support, whether such support presents a plane conical or globular surface, and of an index-finger operated by a cord and a plummet or other equivalent device in the water, and vibrating on a fixed pivot with a double support, or on double hinges, substantially as and for the purpose set forth.

56,004.—OILER.—George J. Capewell, West Cheshire, Conn.:

I claim an oiler constructed with the tube, C, and the tube, D, in combination with the swivel joint, substantially as and for the purpose herein described.

56,005.—TABLE-LEAF SUPPORT.—L. R. Cavender, Eureka, Ill..

I claim an improved table-leaf support formed by combining the pivoted arm, F, the spring, H, and cord, I, constructed and arranged substantially as herein described with each other and with the frame, A, of the table, for the purpose set forth.

56,006.—FIRE-ESCAPE.—J. A. Chambert, Ogdensburg, N. Y.:

I claim, 1st, The combination of the rollers, C, sectional ladder, E, hinged as described, and sliding-frame, D, substantially as and for the purpose set forth.

2d, The supports, B, with the flanges, P, in combination with the sectional ladder, E, and the gearing for elevating the same, the parts being severally constructed and arranged for use, substantially as and for the purpose set forth.

56,007.—PEN AND PENCIL-HOLDER.—James M. Clark, Jersey City, N. J.:

I claim the slotted tube, c, with its ring, l, in combination with the screw-tube, c, attached to the tube, b, and acting upon the pen-socket, o, introduced between the tubes, c and c, in the manner and for the purposes set forth.

56,008.—BED-BUG PROTECTOR FOR BEDSTEADS.—Samuel Clarke, New York City:

I claim, 1st, The combination of the cup, B, and ring, C, with its pendant flange, D, substantially in the manner represented and described.

2d, The pendant flange, D, in combination with the cup or guard, B, and support, A, and with the legs of a bedstead, substantially as and for the purpose specified.

56,009.—CANE-STRIPPER AND KNIFE COMBINED.—Robert Conarroe, Camden, Ohio:

I claim the cane-knife and stripper, consisting of a handled blade provided with a spring gripping jaw which is supported by the guard, E, and combined with the blade by means of the forked ends, w, substantially as described and represented.

56,010.—COMBINED LAMP-CHIMNEY AND SHADE.—Joseph H. Connelly, Wheeling, West Va.:

I claim the combination with the glass chimney, A, and metal top, B, of the shade or reflector, C, when provided with supporting points, c, c, c, and otherwise, constructed and applied as herein specified, to leave an air-space between it and the chimney, lessen the conduction of heat, permit its ready removal, and avoid confining the glass, substantially as set forth.

56,011.—LAMP-SHADE SUPPORTER.—Joseph H. Connelly, Wheeling, West Va.:

I claim a lamp-shade or screen, B, having a metallic rim, a, and a wire or other metal band, c, arranged substantially as set forth, in combination with a supporter consisting of the collar, D, and suspenders and hook, c, d, e, constructed and operating substantially as described, for the purpose of adapting the shade, B, to use with a common bulged chimney or a straight wide chimney, as set forth.

56,012.—DRAFT ATTACHMENT.—Charles W. Connolly, Rochester, N. Y.:

I claim, 1st, The adjustable bows, B, when attached to the front of the hames and used without tugs, substantially as and for the purposes set forth.

2d, In combination with the bows, B, the suspension straps, S, and the steadying straps, S.

3d, The swiveled clip, C, constructed and arranged as described and for the purposes set forth.

56,013.—GONIOMETER.—William W. Cooper, Washington, D. C.:

I claim an instrument constructed substantially as herein described, and which when made of pocket-size, or any other size, serves for measuring vertical angles with great precision, by means of a spirit-level and graduation made along a spiral or zigzag, grooved to receive the free ends of the case which carries the spirit-level bulb.

56,014.—SAFETY WATCH-POCKET.—William W. Covell, New York City:

I claim a watch-protector formed of a case having a spring connected with the hinges by which it is held closed, and against the force of which it must be opened, and having loops upon the rear side by which it is to be attached to the interior side of the pocket, all substantially as described.

56,015.—HEATING-STOVE.—Daniel M. Cummings, Enfield, N. H.:

I claim the combination and arrangement of air-flues or passages, c, a, d, o, n, r, together or singly, with the fire-box or chamber of a stove constructed for heating purposes, substantially in the manner and for the purpose herein set forth.

I claim, also, the combination and arrangement of the direct air-flues, n, with the radiating flues, e, f, of a heating stove, A, substantially in the manner and for the purpose herein set forth.

56,016.—HOOP-SKIRT.—Theodore D. Day, New York City:

I claim, 1st, A spring forming the edges of the opening at the upper and front part of a skeleton skirt, for the purposes and as set forth.

2d, The edge-springs, e, in combination with the bustle-springs, b, b, the ends of said bustle-springs being connected to the edge-springs by hinges or otherwise, as specified.

3d, Attaching the ends of the edge-springs, e, to the upper body hoop or hoops, a, of the skeleton skirt, for the purpose and as set forth.

56,017.—LOW-WATER DETECTER.—Jules Delery, Parish of St. Bernard, La.:

I claim the general arrangement of all the different parts composing my machine, and the combination of the device with the steam-boilers, in the manner and for the purpose described.

56,018.—DUST-BRUSH AND BROOM.—Andrew Dietz, New York City:

I claim the use and application of leather in the construction of brushes and brooms, substantially as and for the purposes set forth.

56,019.—GATE.—Chas. Dixon and S. H. Close, Port Byron, N. Y.:

We claim, 1st, The spur-wheel, G, shaft, E, and bevel-gear,

wheel, H and K, constructed and arranged as described, in combination with each other, with the gate-post, D, and with the rear upright bar, a', of the gate, A, substantially as described and for the purpose set forth.

2d, The combination of the levers, S and T, and hand or chain, R, with each other and with the spur-wheel, G, substantially as described and for the purpose set forth.

3d, The combination of the pin, M, band, L, and rod, O, with each other and with the shaft, E, and bolt, P, substantially as described and for the purpose set forth.

4th, The combination of the pin, J, with the shaft, E, and gear-wheel, H, substantially as described and for the purpose set forth.

56,020.—SEWING MACHINE.—George L. Dulaney, Mechanicsburg, Pa.:

I claim, 1st, The construction of a looping-hook formed of one individual piece of metal of the shape shown at f2, g2, g2, and so connecting said hook in such a manner directly on to the extremity of a rotating axle as to dispense with all secondary joints, rods, elbows, or crank-arms; and so also that while its pivoted end, o3, moves within a slot, J2, up and down with a reciprocating motion, the hooked or barbed end, g2, g2, moves in and describes parts of an ellipse, E, E, and also diagonal lines, E, R, as shown in Fig. 11, the action of said looping-hook being received direct from the end of a primary axle, the motions of both being around one common center, as shown and described.

2d, The manner or mode of constructing, combining, and arranging the cloth "feeding-wheel," r2, r2, r2, r2, so that the hub or center, q3, thereof revolves over and around a stationary sleeve, p2, within which construction the action of a primary driving-wheel is communicated direct to said feeding-wheel, and by which combination and arrangement the looping-hook, f2, g2, g2, receives direct motion, and whereby great simplicity, compactness, and durability of construction are attained, substantially as and for the purpose set forth and described.

3d, The manner or mode of hanging or attaching the cloth feeding-wheel, r2, r2, on to a jointed, hinged, or pivoted standard bracket, bearing, or an axle, W, W, so that said feeding-wheel may be cast off or turned outwardly to one side out of position, or from beneath the material, in the manner as shown by dotted lines in Fig. 1, as and for the purposes set forth and described.

4th, The construction and arrangement of the laterally working detached clutch devices, d3, d3, e3, e3, with the yoke-wires, f4, f4, g4, g4, and the vibrating-lever, r2, r2, y2, y2, as set forth and for the purpose specified.

5th, The peculiar construction and arrangement of the thread tension-wheel, m, m, l3, l3, and the detachable lifting and intermittently acting lever-clutch, n, n, h3, Figs. 1 and 2, or its equivalent, for the purpose substantially as set forth and described.

6th, The peculiar construction of the stationary spool-case holder, K, K2, L2, L2, Figs. 2, 3, and 16, formed of two concave jaw-like pieces provided with (or without) the slot, n6, together with the latch or spool-case guard, p2, n2, Figs. 1, 2, 3, and 16, or its equivalent, as set forth and described and for the purpose specified.

7th, The detachable shield, n6, or its equivalent, in combination with the spool-case holder, for the purpose as set forth and described.

8th, I claim the construction of the inclosed spool-case (or its equivalent) Figs. 7, 8, and 9, together with the encompassing wire-fillet, formed as shown in Figs. 7 and 10, for the purpose substantially as set forth and described.

9th, Constructing a sewing-machine needle with short abrupt grooves, one edge of one (or both) of the grooves being indented or cut away immediately at the side of the eye, as shown at 15, Fig. 13, and by which form of construction any kink, knot, or inequality of thread is prevented from chafing, catching, or clogging between the needle and edge of the needle-puncture at the position where one thread overlays the other close to the edge of the needle, as herein described, as and for the purpose specified.

56,021.—OPERATING ORDNANCE.—James B. Eads, St. Louis, Mo.:

I claim, 1st, The arrangement and combination of the gun-trunnions, a, with the boxes, a', levers, a22, the support, c, screw-shaft, d, nut, e, and connections acting to permanently support the gun at d', and to raise and lower the same, substantially as set forth.

2d The arrangement and combination of the trunnions, a, boxes, a', slots, b, levers, a22, pin, a23, and guides, f, as shown in Figs. 1, 2, and 3, or their general equivalent combination of the trunnions, a, boxes, a', and circular slots, b, of Figs. 4 and 5, when used to produce a change in the axial direction of the gun, substantially as set forth.

3d, The combination and arrangement of the different parts mentioned in my foregoing first and second claims to produce a pendulous gun-motion about a horizontal axis lying in or near the face of the gun, as set forth.

56,022.—CULTIVATOR.—Thos. E. Ellett, Monmouth, Ill.:

I claim, 1st, The combination of wheel, A, bar, P, and axles C, G, with the ends at right angles, for the purpose substantially as described.

2d, The attachment of tongue with side movement, substantially as described.

3d, The bars, H, H, for supporting axle-boxes, F, and clevis, O, substantially as and for the purpose described.

4th, The rod, 2, for the purpose described.

5th, The combination of the axle, G, bars, H, H, wheel, A, and tongue, in a manner to produce side movement, for the purpose and substantially as described.

56,023.—HAY-LOADER.—Wm. H. Elliott, New York City:

I claim, 1st, Joining the arm, c, d, e, to revolving base, b, by means of pivot-bearings, p, so that the arm may have a vertical movement, as described.

2d, The spring-clasp, h, in combination with the fork-handle, g, and cord, m', substantially as and for the purpose set forth.

56,024.—SHEEP-FEEDING RACK.—M. S. Every, Bridgewater, Mich.:

I claim, 1st, The roof, c, c, hinged at the outer edges as described, so as to fall down and shut off access to the troughs whilst the latter are being filled with the feed, substantially as specified.

2d, The manner of pivoting the troughs so that they can be emptied, substantially as specified.

56,025.—SCRUBBING BRUSH.—B. Figer, Cleveland, Ohio:

I claim the removable back or brush, C, in combination with the head, A, and screw-bolts, in the manner and for the purpose set forth.

56,026.—MANUFACTURE OF STEEL.—Anthony L. Fleury, Pittsburg, Pa.:

I claim the processes herein described for the manufacture of bars, rails, or ingots, or steel like iron by treating wrought-iron with melted cast-iron and subjecting the product to the varied treatment of squeezing, compressing, rolling, or hammering, substantially as set forth.

56,027.—DESULPHURIZING GOLD AND SILVER ORES.—Anthony L. Fleury, Pittsburg, Pa.:

I claim, 1st, To treat sulphurets containing gold or silver in the way and for the purpose specified.

2d, The compound obtained, denominated as metalliferous coke, when prepared as above specified.

56,028.—TETHER.—C. L. Folsom, Upper Gilmanton, N. H.:

I claim the construction and arrangement of the swivel-ring, C, and its swivel collar, a, and sleeve, b, substantially as and for the purpose herein specified.

56,029.—STEAM TRAP.—Albert M. Force, Norwich, Conn.:

I claim, 1st, The cylinder having escape-port, G, piston, B, attached to a hollow stem or tube, C, connected with an expanding tube fixed at one end, when combined and arranged together substantially in the manner described, so as to operate as and for the purpose specified.

2d, So hanging the cylinder to the bed-piece, that it can be moved laterally thereon, to adjust its escape-port to the piston, substantially as described.

3d, So constructing or forming the piston, B, that the steam within its chamber or cylinder will act upon both sides and thus balance the same, substantially as specified.

56,030.—CAR-BRAKE.—Nelson R. Forrest, Auburn, N. Y.:

I claim, 1st, The cam, C, placed on the axle of a railway car, for the purpose of actuating automatically a brake, substantially in the manner set forth.

2d, The device for automatically stopping and releasing the hook, M', by means of a pulley, H, and levers, I and L, constructed and arranged substantially as set forth.

56,031.—WASHING MACHINE.—Gilbert S. Foster, Sullivan, Maine:

I claim my improved washing machine, as composed of the washboard, the sectional rubber, the center bolt, and the spring, constructed, arranged, and combined substantially in manner and so as to operate as specified.

56,032.—CAR-SPRING.—Carlos French, Seymour, Conn.:

I claim a car or other spring made of a steel plate previously folded into two, three, four, or more folds, and then bent into form around a mandrel or over a former, substantially as and for the purpose described.

56,033.—TOOL FOR CUTTING TWIST DRILLS.—Wm. Frost, Newark, N. J.:

I claim a tool for cutting twist drills in which that surface or portion which cuts that side of the groove terminating in straight cutting lip shall have a curvature, and the tool be otherwise constructed substantially as described and indicated in Fig. 3 of the drawings.

56,034.—SHIP'S WINDLASS.—John S. Getchell, Machias, Maine:

I claim the combination of the two sets of single or double pawls, L and M, and bent lever-stop, N, with each other, with the lever, H, and with the ratchet-wheels, G, of the windlass, B, substantially as herein described and for the purposes set forth.

56,035.—SCRUBBING BRUSH.—R. P. Gillett, Sparta, Wis.:

I claim the combination of the frame, A, alternate layers of bristles, b, b, or their equivalents, and cross-blocks, c, screw-bolts, B, having nuts, D, and center cross-bar, C, when arranged together so as to operate in the manner and for the purpose described.

56,036.—CHURN.—Theophilus Gillmor, St. Louis, Mo.:

I claim, 1st, The combination of the crank, connecting-rod, and cylinder, substantially as described and for the purpose set forth.

2d, The combination and use of a strap-joint on the connecting-rod, E, with the crank, B2, when used to connect the churn cylinder, C, with the motive power, as set forth.

3d, The combination of the cylinder, C, with the head, C1, and its scoop, C2, also with the inlet funnel, C3, and the outlet faucet, C2, substantially as described and set forth.

56,037.—WOOL-BURRING MACHINE.—C. L. Goddard, New York City:

I claim the manner of constructing inner or skeleton cylinders for burring machines of thin bars or strips of metal inserted in slots in the heads on the shaft, substantially as and for the purpose described.

56,038.—CYLINDER FOR WOOL-BURRING AND CARDING MACHINES.—C. L. Goddard, New York City:

I claim the manner of constructing cylinders for burring and carding machines of a series of wooden lugs secured to two heads on the shaft, and with radial bars inserted in grooves or gains cut into the periphery, substantially as and for the purpose described.

56,039.—GATE.—John H. Graves, Rochester, N. Y.:

I claim the employment in connection with a sliding gate of the extension guide, c, running on rollers, d, f, and provided with sockets or depressions, l, k, l, for fitting over the said rollers, and closed by the reaction of a weight or spring, substantially as described.

I also claim in combination with the above forming the lower edge of the guide, c, and the periphery of the roller, d, with the tongue and groove, g, h, substantially as and for the purpose specified.

I also claim the combination of the catch, q, and handles, r, r, with the projection, o, of the extension guide, when so arranged as to hold the gate from being raised and thrown back when closed, substantially as specified.

I also claim the special arrangement of the wire, w, with the sliding weight, v, cord, t, and pulleys, u, f, f, r producing the reaction of the gate, as set forth.

56,040.—ROOFING CEMENT.—William Green, Cleveland, Ohio:

I claim a cement or paint for roofing, or other purposes for which it may be adapted, composed of pulverized iron ore in combination with pulverized slate, stone, coal, coke, or either of them, the said substances being mixed with mineral or other oils, as herein specified, applied, and used, as set forth.

56,041.—RANGE AND FURNACE COMBINED.—William A. Greene, Troy, N. Y.:

1st, In combination with the oven-flues, P', P', and combustion-chamber, A, I claim the direct communication-flue, N, arranged in manner substantially and for the purposes as herein set forth.

2d, The removable partition plate or wall, D, or its equivalent device, arranged in manner substantially and for the purpose as herein specified.

3d, In combination with the removable partition plate, D, or its equivalent device, and the flue, C, I claim the arrangement of the boiler-hole plate, J, and the sliding doors, L, L, for the purpose of forming additional fire-chamber space, in manner substantially and for the purposes as herein set forth.

4th, In combination with the oven-flues, P', P', and direct flue, N, I claim the arrangement of the dampers, b and c, to operate with reference to each other in manner and for the purpose as herein shown.

56,042.—CONSTRUCTION OF METAL WHEELS.—Ansee Haines, Pekin, Ill., and John Kirkman, Kickapoo, Ill.:

We claim, 1st, The combination of a wrought-metal felloe ring or rings, formed of angle iron or angle steel of the shape substantially as shown, with wrought-metal spokes formeds of angle iron or angle steel, of the shape substantially as shown, the said felloe ring or rings being encircled by a tyre, and the said spokes being fastened by their outer ends to the flanch of the felloe ring or rings, and their inner ends cast into the metal hub, all substantially in the manner and for the purpose herein described.

2d, The manner substantially as herein described of constructing and applying removable thimbles, a, a, to the cast-metal hub of the wheel, for the purpose set forth.

56,043.—BRIDGE.—David Hammond, Canton, Ohio:

I claim, 1st, The peculiar combinations of the double T-irons, b, b, and clamping-pieces, D or F, with bolts, M, M, and hole, N, substantially in the manner and for the purpose herein set forth.

2d, The peculiar combination of the covering-piece, H, the double T-irons, b, b, the securing pieces, J, J, with bolt, e, and nut, K, thereon, substantially in the manner and for the purpose herein set forth.

56,044.—COMPOSITION OF MATTER FOR RENDERING PAINT FIRE-PROOF.—Joseph B. Harris, Germantown, Ky.:

I claim the combination of calcined schist, shell, or mineral coal, prepared as above described, with any kind of oil paint, to render the same uninflammable or fire-proof, substantially as above set forth.

56,045.—STEAM-ENGINE VALVES, ETC.—R. Francis Hatfield, New York City:

I claim, 1st, A rotary valve arranged to supply alternately the parts of two or four double-acting cylinders as required when the shaft-cranks are placed at right angles to one another, substantially as shown and described.

2d, The rotary valve, I, Fig. 10, constructed with two or more wings as shown at Figs. 19, 14, and 21, in connection with the arrangement of the ports, 1, 2, 3, and 4, Figs. 9, 13, and 19, substantially as described and for the purpose specified.

3d, The crank-pin bosses, l and q, Fig. 24, in combination with the screw-bolts, p, p, and the screw-channel in the piece, q, substantially as described and for the purpose set forth.

4th, Arranging the upper part, r, r, Fig. 24, of the crank cross-head to serve as an oil-cup, in combination with the supply wicks, q, q, n, substantially as shown.

5th, The combination of the above several improvements, as shown by the drawings.

56,046.—LEATHER-STRIP.—Hiram A. Hawkins, Virden, Ill.:

I claim the strip, a, in combination with the sliding-lever, c, rollers, B and c, and spring, m, and the incline, n, when said parts are constructed and arranged to operate substantially as and for the purpose set forth.

56,047.—QUARTZ STAMP-MILL.—Alexander Herdlein, Egan Cañon, Nevada:

I claim, 1st, The double-armed levers, F, in combination with the stampers, E, and cranks or other equivalent devices on the driving-shaft, C, constructed and operating substantially as and for the purpose described.

2d, The hinged tappets, I, in combination with the adjustable heads, G, levers, F, and stampers, E, constructed and operating substantially as and for the purpose set forth.

56,048.—MACHINE FOR FOLDING CLOTH.—William F. Heywood, Cumberland, R. I.:

I claim, 1st, The spring nipping-jaws, E, E, in combination with the pendulum frame, C3, and operating together in the manner substantially as described.

2d, An elastic table, M, in combination with the pendulum frame, C3, substantially as described.

3d, Combining with the piece of cloth to be folded the belt-shipping apparatus herein described, operating as and for the purposes set forth.

56,049.—SAFETY POCKET.—William Hindhaugh, New York City:

I claim the bolt, D, and spring-frame, B, in combination with the mouth of a pocket constructed and operating substantially as and for the purpose described.

56,050.—CHURN.—Edwin Hoyt, Stamford, Conn.:

What I claim is a churn in which all the parts described and represented are arranged in the manner set forth.

56,051.—SOLDERING LAMP AND BLOW-PIPE.—John S. Hull, Cincinnati, Ohio:

I claim the arrangement of the condensing pump on the outside of the reservoir, substantially as and for the purpose herein specified.

I also claim the employment of a cut-off valve, c, between the pump and the reservoir, for the purpose set forth.

I also claim the employment of a regulating and cut-off valve, E, between the reservoir and the gas-generator, as described.

I also claim a regulating valve, I, between the gas-generator, G, and the jet orifice, L, as herein set forth.

I also claim the employment of a gas-generating burner, supplied by gas produced by the gas-generator itself, together with the main supply, substantially as and for the purpose herein specified.

56,052.—GAS-HEATER FOR COOKING ETC.—John S. Hull, Cincinnati, Ohi.:

I claim the employment of atmospheric pressure to force the liquid to the burner, in combination with a self-generating gas-burner for cooking and heating purposes, so as to produce a blowing jet of flame at any distance from the reservoir, substantially as herein specified.

I also claim the gas-generating burner retort, M, constructed and operating substantially as described in combination with the condensing-pump and reservoir for forcing the oil to the "retort," for the purpose specified.

I also claim the air-valve, H, having a cork cushion, covered with buckskin, or its equivalent, when applied to the condensing-pump of the reservoir of a cooking apparatus supplied by the force of atmospheric pressure, substantially as described.

I also claim surrounding the pump with the case or tube, C, arranged in combination with the condensing-pump and reservoir of a cooking apparatus supplied by the force of atmospheric pressure, substantially as set forth.

I also claim the packing of asbestos around the stem of the jet-regulator, for the purpose herein set forth.

56,053.—HAND CORN-PLANTER.—D. Humphreys, Oskaloosa, Iowa:

I claim the arrangement in a hand corn-planter of the compound slide, H, I, having the described slotted wings, J, j, and K, k, openings, b and i, i', and rod, h', in combination with the stud, f, or the plunger, F, on the openings, b, b', in the floor, B, as set forth.

56,054.—FIBROUS PACKING FOR STEAM-ENGINE.—J. L. Husband, Philadelphia, Pa. Ante-dated June 19, 1866:

I claim the manufacture of packing for steam-engines, as herein-before described and more specifically set forth, and desire to secure the same by letters-patent therefor.

56,055.—CIGAR PRESS.—Anthony Iske, Lancaster, Pa.:

I claim the arrangement of my combined cases, A, B, constructed by alternate slats, c, y, and spaces meshing one into the other, substantially in the manner and for the purpose specified.

I also claim the use of clamping-irons, I, or their equivalent, for securing the pressure when removed from the press until the cigars have dried, substantially in the manner specified.

56,056.—MILK RACK.—Albert Jackson, Clifton Springs, N. Y.:

I claim, 1st, The combination of the ring-guards, E, with the supporting-arms, D, and wire, F, substantially as described and for the purpose set forth.

2d, The combination of the tin-plate, C, or its equivalent, with the standard, B, substantially as described and for the purpose set forth.

56,057.—VISE.—Abiezer Jameson, Trenton, N. J.:

I claim, 1st, The screw, E, with its convex collar or washer, adapted to the concave sliding washer, K, all substantially as and for the purpose described.

2d, The combination of the above with the washers, G and H, intervening between the collar, f, of the socket, F, and the fixed jaw, A, of the vise.

56,058.—TOOL FOR FINISHING AUGERS.—Russell Jennings, Deep River, Conn.:

I claim a rotary wheel or burr having a beveled surface, a, at one side, and a semi-circular edge or periphery corrugated to form a series of cutters, b, which have a radial or nearly radial position and extend from the inner edge of a to the outer edge of the same and entirely around the semi-circular periphery of

he wheel, in combination with the concave surface, c, at the opposite side of the wheel, substantially as and for the purpose herein set forth.

56,059.—Drill Chuck.—Frank G. Johnson, Brooklyn, N. Y.:

I claim, 1st, The double spring-jaws, A, B, made with the tapering hole, E, F, between them, in the manner and for the purpose substantially as described.

2d, The combination of the said jaws, as described, with the shank, C, and its tapering-bottomed socket, I., by means of which different-sized drills are at once both centred and held at the back end and about midway of their length by simply screwing up the nuts, K, E, essentially in the manner and for the purposes set forth.

56,060.—Railroad Switch.—Robert V. Jones, Canton, Ohio:

I claim, 1st, The lever, B, bar, E, arms, a, a, crooked uprights, D, D, treadle, M, and switch-rod, C, arranged and used substantially as herein specified.

2d, The pitman, H, and spring, K, working in the case, E, the same being locked by the spring, f, with plate, d, and Key, g, said pitman being connected to the lever, B, the whole being constructed, arranged, and operating in the manner and for the purpose set forth.

56,061.—Device for preventing Hogs from Rooting.—Whitcomb Judson, Galesburg, Ill.:

I claim the construction and application of the device on the top of the snout of a hog to prevent rooting, substantially in the manner as described.

56,062.—Machine for making Nuts.—Edward Kaylor, Pittsburg, Pa.:

I claim, 1st, The combination of the side dies, F, F', so constructed as to inclose the nut on all sides but not at the ends, the square punch, d, stationary eye-punch, h, and swage, f, fitting the cavity formed by the side dies, constructed and operating substantially as described, for the purpose of making nuts by cutting off a square blank, forcing it over a perforating punch, molding it into shape, and finishing it with the blow of a hammer.

2d, Finishing the nut after it has been perforated and molded laterally into shape, and while still confined in the side dies, by means of the swage and hammer, substantially as herein-before described.

56,063.—Sprinkler and Dredge.—M. Keep and S. R. Dummer, New York City:

We claim, 1st, The valve-stem, D, when provided with teeth, bars, flanges, or their equivalent, as and for the purposes herein described.

2d, A combination of the valve-stem, D, when barbed or flanged or provided with their equivalents, cups, H, spring, G, cover, B, operating substantially and for the purposes herein described.

56,064.—Sofa Bedstead.—John S. Kinyan, Webster City, Iowa:

I claim, 1st, The hinged bottom, A, A', in combination with the hinged head and foot-boards, B, B', C, C', all arranged to operate substantially as herein specified.

2d, In combination with the above, I claim the catches, E, E, and recesses, F, F, substantially as described.

56,065.—Horse-shoe.—Peter A. La Frame, Elmira, N. Y.:

I claim the slotted shoe, B, when constructed with recesses in the upper face and elongated openings, D, in combination with the receiving plate, A, when constructed with a flange, C, on its inner edge.

56,066.—Suspended.

56,067.—Broom-head.—John H. Lightner, Shirleysburg, Pa.:

I claim, 1st, The toothed bars, I, constructed as described, in combination with the side-plate, B, and door or flap, H, of the broom-head, substantially as described and for the purpose set forth.

2d, The combination of the band, K, constructed and arranged as described, with the side-plate, B, and door or flap, K, substantially as described and for the purpose set forth.

3d, Hinging the door or flap, H, to the solid part of the side-plate, A, at the upper edge of the notch formed in said side-plate, substantially as described and for the purpose set forth.

4th, Securing the handle, E, to the cap, A, B, C, by the wire, G, passing through the notch, e', formed in the side of the said handle, E, substantially as described and for the purpose set forth.

56,068.—Toilet Soap.—George H. Lincoln, Providence, R. I.:

I claim the improvement in soap described, consisting of a bar or cake of soap made up of soaps of different colors and arranged so as to exhibit an ineffaceable ornamental design or trade-mark in one or more contrasting colors, the article being substantially as specified,

56,069.—Lock for Mail-bags and Carpet-sacks.—John B. Logan, Thorntown, Ind.:

I claim, 1st, The combination of the slide-bolts, B, C, D, and stops e, e, slotted sliding bar, E, of the jaw, A, operating with the catches, f, g, h, of the jaw, A', constructed and arranged in the manner and for the purpose herein specified.

2d, The combination of the plate, G, and sliding bar, F, plates, F F, and jaws, A, A', the plates having suitable holes, i, to receive the shackle of a padlock, and preventing the withdrawal of the bolts unless the padlock is removed, arranged in the manner herein represented and described.

56,070.—Steam Gauge.—Joshua Lowe, New York City:

I claim, 1st, The inverted cup, C, working in the annular chamber, D, in combination with a series of weights of gradually increasing size, and with a suitable index, all constructed and operating substantially as and for the purpose described.

2d, Arranging the walls of the annular chamber, D, as and for the purpose set forth.

56,071.—Door Key-fastener.—Samuel Macferran, Philadelphia, Pa.:

I claim, 1st, Constructing the fastener, E, with the hooks, e, e, substantially in the manner herein-before described and for the purpose specified.

2d, The combination of the fastener, E, with the slide, F, by means of the eye, s, of the former, substantially as described and for the purpose specified.

56,072.—Medical Compound.—Lucinda Marmaduke, Shelbyville, Mo.:

I claim the compounding of said herbs or vegetables, as above described.

56,073.—Wagon Spring.—Charles S. Martin, Milwaukee, Wis.:

I claim constructing the springs of vehicles of solid blocks of India-rubber, in the form of the frustrum of a cone or pyramid, or having only an opening sufficient for the passage of a bolt through them, substantially as set forth.

56,074.—Wagon Spring.—Charles S. Martin, Milwaukee, Wis.:

I claim, 1st, Springs, M, inclosed within cylinder, K, substantially as and for the purpose described.

2d, Springs, O, in combination with bolster, C, bar, D, bolts, I, and cups, P, substantially as described.

56,075.—Medicine for Hog Cholera.—John L. Mason, Jefferson, Ky.:

I claim, in combination of the components above-named in the proportion above set forth (or of any other components when combined resulting in a compound with similar properties), which components or combined compound is a prevention and cure of the disease popularly known as hog cholera.

56,076.—Seed-planter.—Ives W. McGaffey, Chicago, Ill.:

I claim, 1st, The seed-distributing cylinder, having holes or cups in its periphery, with screws fitted into the cups for adjusting their capacity, and set-screw at the side to hold them in place, when adjusted in connection with the shifting-slide, N, constructed and operated in the manner and for the purpose substantially as specified.

2d, The adjustable cog or tooth-gears, g and h, for regulating and controlling the seeding device while the machine is moving over the field, constructed and operated substantially as and for the purpose specified.

3d, In combination with the adjustable toothed or cog-gear, g and h, and seeding device, I claim a revolving pointer or marker, F, for marking or indicating the position of the hills in automatic check-row planting.

4th, Constructing a brush for seed-planting machines with cap, bolt, and nut, for holding the bristles, in the manner specified, or its equivalent.

5th, The detachable spur or rod-cutter, r, fitted to the heel of the runner, in the manner and for the purpose specified.

6th, The oscillating plate, W, provided with the sockets for the lever, y, and having the arm, W', provided with the segmental rack, arranged to operate in combination with the pinion, y, on shaft, K, substantially as and for the purpose set forth.

56,077.—Harness-motion of Looms.—W. W. McGregor, Dedham, Mass.:

I claim the combination or mechanism, substantially as described, for operating the harness-carriers, the same consisting of two sets of levers, a, b, the connecting-rods, g, the vibratory arms, f, and the lifter, D, and its rotary cranked wheel, S, with its crank-pin, r.

I also claim the combination of the rest-frame, F, or its equivalent, with the mechanism or combination, substantially as described, for operating the harness-carriers.

I also claim the combination of the stop-bar, y, and the series of studs or catches, z, with the rest-frame, E, the harness-carriers, and their operative mechanism, substantially as described.

I also claim the combination of the slot, n, and adjustable crank-pin, r, and the adjustable rest-frame, E, with the harness-carriers and the mechanism for operating them, substantially as described.

I also claim the application of the slotted curved arm, l, to the remainder of the lifter, D, so as to be adjustable with respect to the same, substantially as and for the purpose specified

56,078.—Composition for coating Ships.—Charles R. Milks, Waterford, N. Y.:

I claim a composition of matter corresponded from the herein-upon named ingredients or their chemical equivalents, substantially in the manner and for the purposes set forth.

56,079.—Bottle-stopper.—T. W. Mirick, Boston, Mass.:

I claim in combination with the frusto-conical stopple, a, wire, c, hinge, d, and latch, e, the wire, e, when bent into two parts, each passing through the stopple, and thus serving both to hold the stopple down and to prevent any sidewise tipping movement.

56,080.—Sash-fastening.—R. E. Monaghan, West Chester, Pa.:

I claim the application of alternating inclined planes attached to both sides of window-sash, doors, gates, and other perpendicular slides, and the use of wheels or rollers and springs operating on both sides of the sash, doors, gates, and other perpendicular slides, and acting as braces to support the sash, doors, gates, and other perpendicular slides, for the purposes above set forth and described.

56,081.—Woven Bag.—Charles Moore, Trenton, N. J.:

I claim, 1st, As my invention and improvement in bags or sacks, increasing the filling or weft of the cloth gradually from the place of tying near the top to the bottom, to make the bag thickest, heaviest, and strongest where it is subject to the greatest strain and the most wear, substantially as described.

2d, In combination with a bag woven gradually thicker from the place of tying to the bottom, I claim the thick weft or edge around the mouth or open end of the bag, formed substantially as described, for the purpose set forth.

56,082.—Clothes-sprinkler.—Herbert A. Morse, Canton, Mass.:

I claim in a clothes-sprinkler constructed as described and provided with the opening, D, the combination and arrangement of the flange, C, substantially as described and for the purposes set forth.

56,083.—Sifter and Strainer.—James M. Muhley, Cambridge, Mass.:

I claim the combination and arrangement of the curved metallic beaters and the changeable sliding sleeves and strainers, and the devices for securing them in position, as described, for the purpose specified.

56,084.—Car Spring.—William R. Nichols, Philadelphia, Pa.:

I claim, 1st, A car-spring constructed of a series of elliptical plates of steel, each of which is complete in itself, and of such size that, being arranged concentrically, they shall fit snugly upon one another, substantially in the manner set forth.

2d, In combination with the above-described form of springs, I claim the case, D, cap, E, and rods, C, when constructed and arranged for use, substantially in the manner and for the purpose set forth.

56,085.—Car-coupling.—James A. Niman, Mansfield, Ohio:

I claim the combination of a pair of draw-bars, each constructed with a swinging-pin, A, an oscillating-bar, B, a link-bed, Q, Q, a link-holder, D, D, and bolt, C, substantially as described, and each provided with a coupling link, as and for the purpose described.

56,086.—Row-lock.—Joseph W. Norcross, Middletown, Conn.:

I claim, 1st, The bed-plate, D, with cylindrical sockets or studs, E, in combination with the plate, C, and bed-plate, A, constructed and operating substantially as and for the purpose described.

2d, The wooden thole-pins, F, in combination with the segmental pectoral sockets, E, constructed and operating substantially as and for the purpose described.

3d, The latch, h, and lugs, c, d, in combination with the plates, C, D, and studs or sockets, E, constructed and operating substantially as and for the purpose described.

56,087.—Tackle-block Sheave.—Joseph W. Norcross, Middletown, Conn.:

I claim a sheave composed of a metal pulley, B, and wooden cheeks, as a new article of manufacture, when composed of the shoulders, d, or the rim, a, to support the cheeks, C, and the projections or spurs, e, on the rim, to retain the cheeks in position, substantially as described.

56,088.—Harrow.—Oscar D. Padrick, Shelbyville, Ind.:

I claim the application of hinged harrow carrying-arms, C, C, to a rigid triangular harrow frame, A, in combination with the extensible braces, D, D, which are provided with means for fastening them together, substantially as described.

56,089.—Sheet-metal Water-wheel.—Rees Palmer, West Chester, Pa.:

I claim, in combination with the sheet-metal band, A, supported by the arms, D, as described, the sheet-metal buckets, B when the said buckets are constructed and applied to the said band, in the manner and for the purpose described.

56,090.—Tuyere.—James Patterson, New York City:

I claim the combination of the rod, G, with its catch, e, the rods, E, F, and perforated conical valve, D, arranged relatively with the hollow base, A, and the fire-bed, B, with the conical flange, a, constructed and operating in the manner and for the purpose herein specified.

56,091.—Dough-kneader, Meat-pounder, etc.—Philander Perry, Charlestown, Mass.:

I claim, 1st, The spring, K, in combination with the jointed lever-pillar and platform, when constructed and used substantially as described.

2d, The dovetailed groove for the purpose of holding the tools in connection with the movable lever and platform, all constructed and used substantially as described.

3d, The whole machine, being the combination of the above tools, viz., the beef-tenderer, potato-masher, meat-chopper, pastry-roller, and dough-kneader, or either of them, with the double-jointed lever, pillar, and platform, when constructed and used substantially as described.

56,092.—Lamp-chimney, Bottle, or Can-cleaner.—C. M. Pond, Oberlin, Ohio:

I claim the adjustable rubber, A, and handle, B, when combined substantially as and for the purpose described.

56,093.—Mowing Machine.—Calvin Reed, Springfield, Ohio:

I claim, 1st, The cam-wheel, E, in combination with the rock-shaft, h, for operating the sickle-bar, D, when arranged as shown and described.

2d, Connecting the sliding-lever, p, to the shoe, K, by means of the bolt, i, and spiral rod, t, when said parts are arranged to operate as herein described.

3d, The combination of the levers, y and p, with the pivoted or hinged shoe, K, arranged and operating as and for the purpose set forth.

56,094.—Refrigerator.—Charles B. Rees and J. B. Tevis, Philadelphia, Pa.:

We claim, 1st, Retaining the drippings from the ice in vertical and horizontal pipes, for the purpose specified and described.

2d, An adjusting carrying-block, for adjusting the hight of the ice in the vertical pipes, substantially as shown.

3d, The vertical pipes, F, and the horizontal pipe, E, combined and arranged and situated either on one or both sides of the refrigerator, as specified and described.

4th, The vertical pipes, F, and the horizontal pipe, E, and the drip-pan, D, combined and arranged and placed either on one or both sides of the refrigerator, substantially as shown.

56,095.—Machinery for tapping Nuts.—David Reese, Newburg, Ohio:

I claim, 1st, The standards, b, sheeves, d, and weights, h, in combination with the mandrels, J, pinion, r, gear, H, and braces, f, arranged and operating in the manner and for the purpose set forth.

2d, The arrangement of the trough, C, revolving arms, E, E, and shaft, D, in combination with the gearings, D' and c', and weighted stop, L, operating in the manner and for the purpose set forth.

3d, The stop, L, in combination with the revolving frame, K, as and for the purpose set forth.

56,096.—Automatic Boiler-feeder.—G. A. Riedel, Philadelphia, Pa.,

I claim, 1st, The two reservoirs, F and F', in combination with a chest, A, valves, B and B', and ports, pipes, and passages, substantially as described, the whole being applied to a steam boiler, and operating substantially as set forth.

2d, In combination with the two vibrating reservoirs, I claim the weight, H, so arranged and operating as to prevent the tendency of one reservoir to balance the other.

3d, The arrangement substantially as described of the tank, Q, and the injector, for the purpose specified.

56,097.—Evaporator.—J. F. Riggs, St. Joseph, Mo.:

I claim, 1st, A cast-iron transverse current evaporator, when made in sections, so as to be able to increase the size of the pan by the insertion of one or more sections, substantially as and for the purpose described.

2d, Suspending a skimming apparatus over the pan by an elastic contrivance, for the purposes described.

3d, The sections, A, A, A, A, the connecting-rods, B, B, the lugs, C, C, C, C, substantially as and for the purposes described.

4th, The lugs, C, C, C, C, the connecting bolts, b, b, the side-bolts, h, h, substantially as and for the purposes described.

5th, A scum trough inclining from the ends towards the center with an opening covered with any suitable strainer, substantially as and for the purposes described.

6th, The socket, O, O, the elastic springs, T, T, the chains, t, t, the handles, s, s, the grooves, U, U, the sliding gates, V, V, and the hooks, X, X, substantially as and for the purposes described.

56,098.—Water-box for Tuyeres.—George M. Robinson, New Wilmington, Pa.:

I claim the water-box, h, with tuyere-pipe, g, passing through it, when constructed and arranged as described, the box being open on top and projecting outside of the back-wall or chimney for the purpose herein-before set forth.

56,099.—Cutlery.—William W. Robinson, Ripon, Wis.:

I claim constructing and attaching the blades and handles of knives and forks in such manner that the handle, composed of any suitable material, shall be secured between the tongue, C, and to the flange, E, substantially in the manner set forth.

56,100.—Saw-gummer.—Phillip Roche, Binghamton, N. Y.:

I claim the combination and arrangement of the adjustable lever, B, sliding-block, D, eccentric lever, C, and indicator, H, substantially as described and for the purposes set forth.

56,101.—Pump.—J. M. Roebuck and W. R. Reece, Donaldson, Pa.:

We claim in a pump the removable case, C, divided by partitions substantially as described, and furnished with valves and openings, as set forth, for the purpose of being readily repaired or renewed without disturbing the rest of the machinery, as set forth.

56,102.—Cultivator.—John S. and Ira Rowell, Beaver Dam, Wis.:

We claim the combination of the slotted beam, A, shank, B, brace-bar, C, and bolt, D, when the parts are constructed and arranged to operate as and for the purposes herein specified.

56,103.—Churn.—Jacob T. Rust, Oquaka Junction, Ill.:

I claim constructing, arranging, and operating the dashers, L, M, in the manner and for the purposes herein specified.

56,104.—Combined Inkstand, Wafer or Sand-box, Calendar, Letter and Envelope Holder, and Pen-rack.—George Schmidt, New York City:

I claim as a combination of inkstand, wafer or sand box, calendar, letter and envelope holder, and pen-rack, substantially as herein shown and described.

56,105.—FAUCET.—Conrad Schullian New York City:
I claim operating the air-valve or vent of a faucet by the action of the handle which serves to open and close the plug, substantially as and for the purpose set forth.

56,106.—MUSICAL INSTRUMENT.—Daniel Schuyler, Buffalo, N. Y.:
I claim a combination of valves and air-chambers so constructed and arranged that by blowing the wind through the air-chambers or drawing the wind back and out of the air-chambers the wind will in both cases pass through the reeds in one and the same direction, substantially for the purpose set forth.

56,107.—CARBON-OIL FIRE-TESTER.—George E. Shaw, Pittsburg, Pa.:
I claim, 1st, The water-bath, D, with its double casing, F, and top, E, as described, and the pipe, C, for the purpose of obtaining heat from the bottom only, as specified.
2d, The combination of the two thermometers, M and N, with the water-bath, D, and oil-cup, H, for the purpose specified.
3d, The shield, P, with its notch, Q.
4th, The combination of the pivoted lever fire-brand holder, R, with the ring and rod, S, and the spring, T, arranged as described and acting as specified.

56,108.—QUARTZ-CRUSHER.—Thomas I Shaw, Philadelphia, Pa.:
I claim the employment of metal balls secured by chains to a revolving wheel, the whole constructed and operating for the purpose described.

56,109.—CHIMNEY-CAP.—J. Herbert Shedd and Benjamin Worcester, Waltham, Mass.:
We claim, 1st, The combination of a fixed cover above a flue, with a movable shield so adjusted as to be made by the force of the wind to close the opening between the flue and the cover on the windward side while the leeward side is left open.
2d, The construction and arrangement of the base, B, with its spherical surface, K, and of the cap, C, with its curved under surface and projection, M, substantially as described.
3d, The ring, E, with the tunnel-shaped jets, N, N, in combination with the base, B, and cap, C, substantially as described.

56,110.—WASHING AND WRINGING MACHINE.—W. S. Shoemaker, Greenwood, Md.:
I claim, 1st, The hinged shelf in combination with the washtub and the rollers, substantially as and for the purpose described.
2d, The hand-lever, J, in combination with the hinged shelf-rollers and wash-tub, substantially as and for the purpose described.
3d, The combination of the two squeezing-rollers, B, B', stretching-roller, D, rubber-belt, G, and hinged shelf, G', substantially as and for the purpose described.

56,111.—LIFTING-JACK.—Luther Smith, Rochester, Minn.:
I claim, 1st, The catch, G, actuated by the spiral spring, G', in combination with the jack-bar, B.
2d, The arrangement of a lifting-jack having the stock, A, bar, B, lever, D, stamp, E, catch, G, and spiral spring, G', the parts being constructed and combined substantially as and for the purpose set forth.

56,112.—BUTTER-WORKER AND MOLD.—T. D. Smith, Independence, Ohio:
I claim the arm, F, pivoted or hinged at K, and lever, H, pivoted or hinged at N, in combination with the frame, A, mold, P, and stamp, L, arranged as and for the purpose set forth.

56,113.—CAR SPITTOON.—Willison G. Smith, Carlisle, Pa.:
In combination with the sides of an inserted box of any shape, even with the floor of the car, I claim the adjustable lid and bottom connected by the bolt and sliding in the guides, as described.

56,114.—NAIL AND TACK.—Rachel Speer, Passaic, N. J.:
I claim making nails and tacks with bodies formed of double cones, or having conical outlines on opposite sides thereof, substantially as described.

56,115.—CHURN.—Otis W. Stanford, Lebanon, Ohio:
I claim the combination of the standard, C, catch, D, c, pulleys, E, G, and driver, g, constituting a detachable propelling device and arranged to operate in connection with dasher, K, substantially as and for the purposes set forth.

56,116.—TREATING GAS FOR ILLUMINATION AND OTHER PURPOSES.—Levi Stevens, Fitchburg, Mass.:
I claim, 1st, The combination of two or more gas-meter wheels, propelled by gas or other power, for the purpose of carbonizing atmospheric air and super-carbonizing ordinary illuminating coal-gas, so that when combined and mixed the whole will become an illuminating gas, substantially in the manner and for the purpose described.
2d, The combination of two or more gas-meter wheels, propelled by gas or other power, with a chain elevator, and all with a tank or reservoir for holding hydro-carbon and for receiving and mixing super-carbonized gas and carbonized atmospheric air for the production of an illuminating gas, in the manner and for the purposes described.
3d, The combination of two or more gas-meter wheels, propelled by gas or other power, with a chain elevator, s, and the receiver, C, and all with the reservoir, A, in such manner that the gasoline or other hydro-carbon may be kept at the desired light in the cases of the gas-meter wheels, in the manner and for the purposes described.

56,117.—SHIP'S TABLE.—Isaac H. Stoddard, Amenia, N. Y. Ante-dated June 30, 1866:
I claim the arrangement of the tables (C), with the rods (F), (G), and (H), and with the arm, g, and weight, E, substantially as and for the purpose herein set forth.

56,118.—MEANS FOR DRIVING PADDLE-WHEELS.—Joseph M. Story, Cincinnati, Ohio:
I claim applying the power to the paddle-wheels of boats near the periphery of the same by means of friction-wheels and levers in the manner and for the purpose substantially as herein set forth.

56,119.—BROOM-HEAD.—William D. Stroud, Oshkosh, Wis.:
I claim a broom-head made of flexible bands connected by a rigid strip with an open space between the bands and an open space around the handle, as described, in combination with the rigid binders, D, D, and handle, C, the whole being constructed and operated substantially in the manner and for the purpose set forth.

56,120.—HYDRAULIC ENGINE.—Homer H. Stuart, Jamaica, N. Y.:
I claim the valve with its passages as shown, when operated by the eccentrically grooved plate in connection with the gudgeon and connecting-bar, substantially as described.

56,121.—PROCESS FOR REFINING OIL.—E. G. Sutherland, San Francisco, Cal.:
I claim the within-described process for extracting and refining oil from whales and other marine animals and fishes, all substantially as described and for the purposes set forth.

56,122.—CORN CULTIVATOR.—C. W. Taliaferro, Keithsburg, Ill.:
I claim, 1st, The particular manner of constructing the frame of the machine, to wit, of two parallel bars, A, connected by semi-circular metallic bars, B, with the axles, E, fitted between or having their bearings in said bars, substantially as shown and for the purpose set forth.
2d, The connecting of the plow-beams, F, F, to the axles, E, by having the latter formed with slats, a, to receive clevises, a', at the front ends of the beams, with pins, b, passing through the angles and clevises, substantially as and for the purpose specified.

56,123.—PAPER GAUGE FOR PRINTING-PRESSES.—J. Warren Thyng, Salem, Mass.:
I claim the combination and arrangement of the graduated grooved bar, B, attached to the edge of the platen, the adjusting clamps, C, C, C, and gauge-rods, F, F, G, substantially as and for the purpose herein specified.

56,124.—NUT.—Levi Till, Sandusky, Ohio:
I claim so securing a washer to a screw or other nut that, while it can freely turn on the face of the nut, it cannot become disengaged therefrom, substantially in the manner described.

56,125.—BINOCULAR EYE-PIECE FOR MICROSCOPES.—Robert B. Tolles, Canastota, N. Y.:
I claim the construction of an eye-piece in such a manner that the division of the optical pencil necessary to give binocular vision of an object is effected in the eye-piece itself, restricting my claim, however, to that form of a binocular eye-piece, in which two real or virtual images of the object are formed in the eye-piece, after such division of the pencil has taken place.

56,126.—FIXTURE FOR RATCHET-WHEELS FOR LAMPS.—Howel Topping, Marion, N Y., and Merritt Galiy, Auburn, N. Y.:
We claim the application of a spring to the shaft of the ratchet-wheels of a lamp-top, pressing the wheels against the wick, in combination with slots in the sides of the lamp-top, allowing the movement of said shaft for different degrees of compressure, substantially as herein set forth.

56,127.—BEEHIVE.—James Wash, Mount Sterling, Ill..
I claim the combination of the vats, C, trunk, D, door, e, tube, E, and leg, g, table, A, and hive, B, constructed and arranged in the manner and for the purpose herein specified.

56,128.—MOSQUITO-BAR.—Chauncey L. S. Walker, Newark, N. J..
I claim the frame adjustable by the slots, a, and screws, c, in combination with the wire-cloth upon both parts of the frame, as herein specified.

56,129.—RECIPROCATING PUMP.—D. M. Weston, Boston, Mass.:
I claim the cushions or springs, C, C, made of rubber or other elastic material, or their equivalents, so placed as to form part of the connection between the piston of a pump and the driving-gear, substantially as above described and for the purpose of relieving the pump and machinery from jar or concussion.

56,130.—CONDENSER.—Norman W. Wheeler, Brooklyn, N. Y.:
1st, In an apparatus for surface condensation or refrigeration, I claim producing the desired result by directing the refrigerating fluids into the refrigerating vessels in such a way that they shall form their sheets or strata on the inner surfaces thereof, which cling to such surfaces under the influence of centrifugal forces, when such vessels are prevented from filling with liquid, substantially as above described.
2d, In an apparatus for surface condensation or refrigeration, I claim facilitating the object sought by directing the substances to be condensed or cooled into inclosed spaces, surrounding the refrigerating vessels in such a way that they will not infringe primarily against the principal refrigerating surfaces, but against the inclosing surfaces under the influence of centrifugal force, substantially as and for the purpose above set forth.
3d, In an apparatus for surface condensation or refrigeration, I claim the mode herein described of preventing the refrigerating liquid from accumulating in the interior of the refrigerating vessels, to wit, by means of injecting air into such vessels by mechanical means, substantially in the manner above described.

56,131.—KEROSENE-BURNER.—Luther C. White, Waterbury, Conn.:
I claim combining the deflector, H, constructed substantially as described, with the wick-tube, cap, and shell, when the same shall be combined substantially as shown for the purposes specified.

56,132.—BED-SPRING.—Nelson B. White, South Dedham, Mass.:
I claim the arrangement and application of the overlapping clasps, C, C, made as described with the slat, B, the base coil of the spring and the projection, a, to enter such slat, the whole being substantially as and for the purpose set forth.

56,133.—SPINNING MULE.—Robert Wilde, Philadelphia, Pa.:
I claim the sliding-rod, F, levers, F, G, and H, and the weight, D, or its equivalent, the same being constructed, arranged, and applied so as to operate substantially as and for the purpose described.

56,134.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:
I claim the clip, B, in combination with the bar, A, calk, C, rivets, f, f, and keys, e, d, the whole being constructed and operated substantially in the manner and for the purpose set forth.

56,135.—STEAM GAUGE.—Charles A. Wilson, Cincinnati, Ohio:
I claim the diaphragm, A, for steam-pressure gauges, when constructed with my intersecting corrugations, as and for the purposes set forth.

56,136.—GRAIN-COOLER.—George D. Woodworth, Chicago, Ill.:
I claim the new and useful mode of preventing grain and other material from being heated while in process of grinding, as herein set forth, and particularly the following:—
1. Covering the eye of the stone to prevent the escape of the air, substantially as set forth.
2. The construction and arrangement of an air-tube, in the manner above set forth.
3. The construction of a pipe made flexible in whole or in part by loose joints, or otherwise, in order that it may adjust itself to the vibrations of the stone.
4. The construction of a false eye of wood bolted in some oily substance, to furnish a durable and substantial bearing for the lower end of the tube or cylinder.
5. The construction of a door in the cover of the stone, to remove any obstructions collecting therein.
6. The constructing the sides or tops, or both, of the discharge-spout, conveyors, or elevators, of bunting or other suitable material, to allow the escape of the air after being used and to further cool and dry out the material ground.

56,137.—TUBULAR WELL.—W. G. Wright, Hornellsville, N. Y.:
I claim the use of hemp or any suitable fibrous filtering material, as described.

56,138.—SAWING MACHINE.—T. L. Yates, Utica, N Y.:
I claim the combination of the roller, E, arm, F, slotted bent-arm G, applied and operating with the gauging and feeding saw, in the manner and for the purpose herein specified.

56,139.—SAFETY POCKET.—Charles H. Bagley, assignor to C. E. Mason and P. S. Bartlett, Elgin, Ill.:
I claim, 1st, Providing the plate, A, with the spring, B, substantially as and for the purpose specified.
2d, The combination of the button or shed, E, with the plate, A, and spring, B, substantially as specified.

56,140.—METHOD OF PREPARING COTTON-SEED FOR PLANTING.—William Blessing, Jeffersonville, Ohio, assignor to himself and Horatio B. Maynard, Washington, Ohio:
I claim the mode of preparing cotton-seed for planting by the application of mucilage, sand, and flour, or their equivalents, substantially as and for the purposes set forth.

56,141.—TOOL FOR TURNING OR PLANING.—Theodore Cooper, Warwick, R. I., assignor to himself and Thomas Phillips, Providence, R. I.:
I claim the holder, A, cutter, B, clamp, C, and key, D, arranged substantially as described for the purposes specified.

56,142.—SAW.—J. E. Emerson, assignor to The American Saw Company, Trenton, N. J.:
I claim constructing the teeth of a saw with recesses in such a manner that they may be attached to projections from the saw-plate, substantially in the manner herein shown and described.

56,143.—APPARATUS FOR PRODUCING AND BURNING THE GASES FROM PETROLEUM AND WATER.—Alva J. Griffin, Lowell, Mass., assignor to himself and William T. Vose, Newtonville, Mass.:
I claim, 1st, Constructing the chamber, A, with a longitudinal partition, K, and lateral ribs, H, elevated and depressed at alternate ends, substantially in the manner and for the purpose set forth.
2d, In combination with the chamber, A, divided into two compartments by a central partition, I claim the pipes, D and E, when constructed and arranged in relation to the chamber, A, and to one another, as and for the purpose set forth.

56,144.—KNIFE FOR REMOVING HAIR FROM HIDES.—Barzilla Harrington, assignor to himself and J. L. Newton, Boston, Mass.:
I claim a short hair knife with its form of blade, b, its rib, c, and its guard, d, combined and arranged substantially as and for the purpose above set forth.

56,145.—HEAD-BLOCK FOR SAW-MILLS.—C. Leffingwell, Clarksburg, Ohio, assignor to himself, H. Blandy, and F. J. L. Blandy, Zanesville, Ohio:
I claim, 1st, The pawl-blocks, C, G, F, H, I, when constructed and arranged substantially as herein described and for the purpose set forth.
2d, The combination of the lever, K, rod, M, rods, N and O, rods, R and U, levers, P and T, rods, S and V, and movable racks, E, by means of which the knees of the head-blocks are worked with each other and with the movable pawls, F, substantially as described and for the purpose set forth.

56,146.—CLASP FOR THE BOTTOM HOOPS OF SKIRTS.—Luther W. McFarland, assignor to Frederick S. Otis, Brooklyn, N. Y.:
I claim the bottom clasp formed with teeth, as specified, for attaching the tape to the hoop and protecting said tape, as set forth.

56,147.—WRENCH.—A. M. Olds, New York City, assignor to himself and Albert Manvel, Elizabethport, N. J.:
I claim, 1st, So combining and arranging the spring-tooth, D, jaw, C, and shank, B, that the tooth will gripe or bind against the bottom of the mortise of the shank and retain the said tooth in position without serrations in the shank, substantially as described.
2d, The mortise, b, in combination with the shank, B, spring-tooth, D, and jaw, C, constructed and operating substantially as and for the purpose described.

56,148.—COAL-STOVE.—J. W. Paige, Corning, N. Y., assignor to himself and J. L. Paige, Rochester, N. Y.:
I claim, 1st, The arrangement of the concentrating-plate, F, in combination with the fire-pot, P, and the outer case of the stove, substantially as shown and described and for the purposes set forth.
2d, The arrangement of the radiating-plate, F, in relation to the concentration-plate, E, substantially for the purposes specified.

56,149.—GEAR-CUTTER.—Edward Parker, assignor to himself and Julius Hotchkiss, Middletown, Conn.:
I claim the jointed bracket, G, in combination with the bed-plate, F, slide, E, with head, D, or D*, and arbor, A, constructed substantially as and for the purpose described.

56,150.—QUARTZ-CRUSHER.—S. B. Pike, assignor to himself and Robert H. Vance, San Francisco, Cal.:
I claim, 1st, The use of the guides, L, L, when arranged as described, to insure the passage of all the ore under the rollers, substantially as herein specified and for the purpose set forth.
2d, The employment of the horizontal bar, H, hub, I, and slotted boxes, K, K, or their equivalents, for the purpose of allowing the rollers, F, F, to accommodate themselves to the varying amount of ore on the revolving plate, B, and die, C, substantially as described and for the purposes as set forth.
3d, The gutter, D, operated by the binders, Y, Y, and keys, X, X, in combination with the revolving plate, B, B, rollers, F, F, guides, L, L, annular die, C, and scrapers, when constructed to operate in the manner specified and for the purposes set forth.

56,151.—SHELLAC VARNISH.—Lewis A. Smith, assignor to himself and George Burrows, Cincinnati, Ohio:
I claim, as a new article of manufacture, a varnish compounded of shellac and bicarbonate of soda, in any suitable proportions, substantially as set forth.

56,152.—MACHINE FOR MAKING METAL TUBES.—P. L. Weimer, Lebanon, Pa., assignor to the Aurora Iron Co., Lebanon, Pa.:
I claim, 1st, The arrangement of the bending rollers, d, d, e, e, and f, f', in a machine which is constructed and operates substantially as and for the purpose described.
2d, While not claiming broadly the scarfing-rollers, b, b, and the bending-rollers, c, c, I do claim these rollers in combination with the bending-rollers, d, and the rollers, e, e, or f, f, all arranged and operating substantially in the manner described and for the purpose set forth.

56,153.—CHURN.—George L. Witsil, Philadelphia, Pa., assignor to himself, John W. Olcott, and Warren S. Smith, New York City:
I claim the combination in the dash-rod of a churn of a lower hollow section, b and an upper spirally grooved solid section, a, c, the former serving to admit a supply of fresh air, while the latter receives a tooth, e, by which the dash-rod is rotated as it is moved up and down by the swivel-handle, G, or other device, substantially as described.

56,154.—REFRIGERATOR.—John Worrall, assignor to himself and Jesse Cudworth, New Haven, Conn.:

I claim the closely-fitting ice-chamber, B, with aperture, a, in its ends, in combination with the provision-chamber, c, tube, E, and water-pipe, c, constructed and operating substantially as and for the purpose described.

Also, the water-trap, f, in the interior of the tube, E, in combination with the ice-chamber, B, and provision-chamber, c, constructed and operating substantially as and for the purpose set forth.

56,155.—HYDRO-CARBON BURNER.—Moritz Herzog, Vienna, Austria, and D. L. Cohn, London, England:

I claim the combination in a lamp of the following devices, viz., the hydro-carbon reservoir, the gas-burner, the air-forcing mechanism, connecting-pipes, and case, the whole being combined and operating substantially as herein-before set forth.

56,156.—LIQUID AND SPIRIT METER.—William Murphy, Cork, Ireland:

I claim, 1st. The beveled plates, H, in the inclined plane, R, in combination with the bucket-wheel, I, and sample-receiver, F, constructed and operating substantially as and for the purpose described.

2d, The method herein described of checking the motion of the bucket-wheel, I, according to the specific gravity of the spirits, consisting of the hydrometer, N, balance weight, l, lever, L, and pulleys, K, J, or other equivalent means which will produce the same effect.

3d, The balance-funnel, B, and tilting-frame, D, in combination with the balance-frame, E', and hydrometer, G', G'', constructed and operating substantially as and for the purpose set forth.

DESIGNS.

2,342 to 2,344 (3 cases).—PAPER COLLAR.—B. G. Briggs, assignor to himself and T. Hilton, Providence, R. I

2,345.—STOVE PANEL.—Charles H. Drew, Great Falls, N. H.

2,346.—PAPER COLLAR.—Chas. D. Elliot, Cambridge, Mass.

2,347.—BOTTLE.—E. C. Fougera, Brooklyn, N. Y., and B. A. Vanderkieft, New York City.

2,348.—COLLAR AND CUFFS.—Edward J. Frost, Springfield, Mass.

2,349.—ORNAMENTATION OF TOPS.—Edward F Kelly, Chicago, Ill.

2,350.—COOK'S STOVE.—J. Martino, J. Beesley, and J. Currie, assignors to A. Sheppard, Philadelphia, Pa.

2,351.—BASE-BALL BAT.—W. H. and Philip Reed, Philadelphia, Pa.

2,352.—GROUP OF FIGURES.—John Rogers, New York City.

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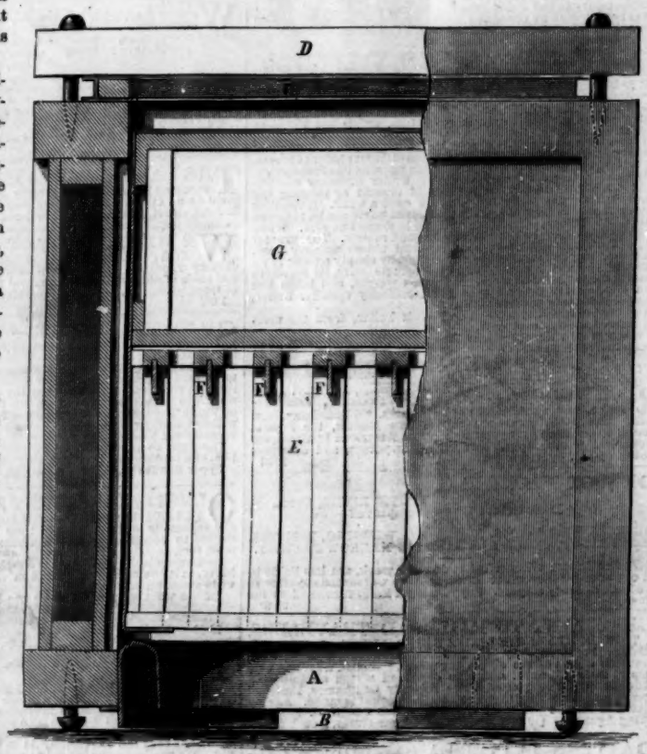
Improved Beehive.

From the earliest historical times the product of the bee has been considered valuable. The land of Canaan was described as a "land flowing with milk and honey," and the works of the ancient heathen poets descanted on the delights of honeyed preparations for the palate. The breeding of the honey bee and the proper contrivances for the deposition of honey have become, in this country, important adjuncts to the means of the husbandman.

The improvement illustrated in the engraving claims to be superior to the hives in common use. Its advantages are, rendering the hive proof against the disastrous and sudden changes of temperature, and the ravages of the bee moth, furnishing a superior breeding chamber, and facilitating the removal of the comb and honey.



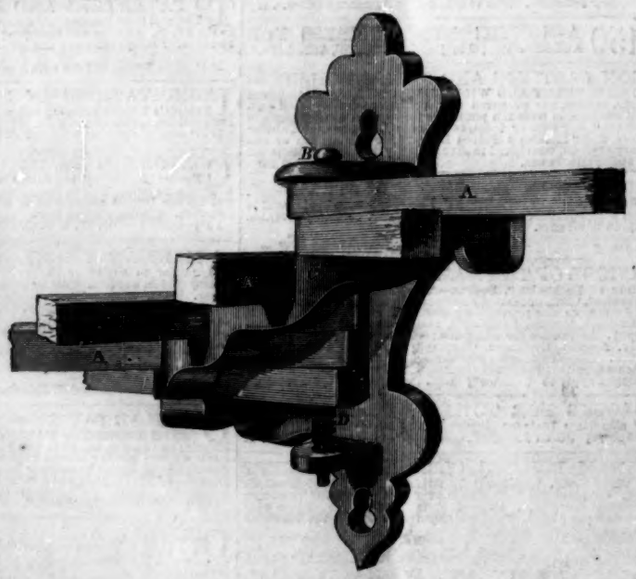
TAYLOR & COX'S BEEHIVE.

The engraving represents the hive partly in elevation and partly in section. It is built of frame work, the uprights and horizontals connected at the corners, to which are nailed, both inside and outside, laths, leaving an air space between; these laths are coated with plaster, making a perfectly air-tight box in connection with the top. The bottom has, extending around the sides, a moth guard, A, in section, like an inverted U, having the inner leg the shortest. At B is the door, and the inner surface of the guard is smeared with lard, or some other substance of similar consistency, which effectually prevents the entrance of the moth. The top of the hive is secured by means of a raised rim, C, sheathed with tin, which projects above the rim, and on which the cover, D, shuts down and is fastened by screws. Strips of leather or rubber may be interposed between the rim and the cover. The brood or comb box, E, is made of thin slats of wood, except the bottom, which is open, and covered with paper pasted on all sides but the top and bottom. This is furnished with strips of tin, F, let in to the top of the uprights and dipped in wax, as an inducement to the bees in forming the comb. By this means each comb is separated, and the strips of comb will always be vertical and distinct. The honey box fits into the space, G, and is of similar construction to the brood box, except that the sides are formed by uprights at the corners, while the top and bottom are of slats. The sides of the box are composed of paper. The apertures between the top slats of the lower box, and the bottom slats of the upper, afford egress from the lower and ingress to the upper box. By this arrangement it will be seen that the two thicknesses of mortar on the sides inclosing an air space, the hermetical sealing of the top, and the paper sides of the inside boxes, insure a uniform temperature at all times. The comb, and the comb box itself, can be easily divided by a chisel-shaped knife, corresponding in width of blade with the width of the box, and the comb be thus easily removed.

Patented Feb. 13, 1866. For further information address Edwin Cox, Jordan, Wis., or John Hobart, Monroe, Wis.

Improved Towel Rack.

The unstable character of the common towel rack or clothes-bar used in the dressing room, and the unhandy form of the common clothes-horse, with the space it occupies when spread, renders this neat improvement a very useful article. Its structure and operation can be readily understood by the engraving. It is designed to be secured to the wall by screws, and when not in use the bars, A, are swung back out of the way. By simply moving them on a common pivot, B, the bars can be extended at varying angles and are supported by the ledges, C, and held in place by the spiral spring, D.



HOTCHKISS'S TOWEL RACK.

Patented May 15, 1866. For further information address M. D. Hotchkiss, Sheboygan Falls, Wis

THE SEWING MACHINE AND THE SHOE MANUFACTURE.

A recent number of the *Shoe and Leather Reporter* contains an article on the results of the application of the sewing machine to shoemaking. While allowing for celerity and facility of production, it insists that the quality of the work is inferior to that produced by the old hand-sewing. It says:—

"The sole-sewing machine has no strength of tension, no power of 'pull,' if we may so express it, and added to this defect, is the very faulty distribution or incorporation of wax with the thread, which, it appears, is a part of the business of the machine to attend to. Little or no wax is applied. This sole-sewing machine necessitates another defect. The upper has to be nailed to the inner sole. In a week after wearing, these nails begin to work through the shoe, and cut the stocking, and generally in thirty days, if there has been wet walking, the outer sole rips, although scarcely worn, and the shoe is ruined; for no ordinary shoe repairer can well re-sew a machine-sewed sole. He must own just such a machine to do it, and not one shoemaker, so called, in a thousand, can afford it."

Another difficulty in making the sewing machine equal the work of the human hand, is the necessity of having the thread much smaller than the perforation of the needle. In sewing leather, especially, the thread should completely fill the space made through its substance by the needle. This can be done only by drawing, or tension, which the *Reporter* thinks the sole-sewing machine is incapable of exerting to a sufficient extent. It is certain, whatever may be the reason, that machine-sewed shoes are much inferior to those sewed by hand by an honest and conscientious workman. The prejudice against them is strong and increasing. It appears that an improvement is needed in these shoe machines which will enable them to compete with hand labor in the durability and value of their work as they now do in the rapidity of execution. Let our inventors look to this matter.

MECHANICS

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